Nuffield Farming Scholarships Trust

Opportunities in hill and upland beef and sheep enterprises including forms of land tenure that create opportunities for new entrants

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1. Acknowledgements

Firstly, can I express my sincere thanks to the Royal Smithfield Club and the Royal Welsh Agricultural Society for sponsoring this Nuffield Food Chain Award. It really has been an awesome experience which has allowed me not only to undertake the study but also to re-evaluate my career.

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Disclaimer

The views expressed in this report are entirely my own and do not necessarily represent the views of the Nuffield Farming Scholarships Trust, or my sponsors, or any other sponsoring body.

2. Executive Summary

My study considered the hill and upland areas of the UK. These areas attract thousands of visitors because of their beauty but provide few options for farmers. Traditional beef and sheep farming in these areas is vital both for landscape and cultural reasons as well as providing a backdrop for the tourist industry. The topography prevents diversification into arable crops or dairy enterprises and the high level of investment in current systems is often a barrier to change. A further barrier is the potential designation of lands within National Parks, as SSSI (Site of Special Scientific Interest), SAC (Special Area of Conservation), or AONB (Area of Outstanding Natural Beauty).

Globally, asset ownership has been the primary mechanism for beef and sheep farmers to create wealth. As the growth in asset value slows, so farmers need to focus more specifically on their farming systems.

In the UK, the single farm payment (SFP) can cause complacency to creep in. The countries that I visited which did not benefit from production support payments showed that producers were very aware of their cost of production. They would seek out tools to continually improve their efficiency and reduce business risk.

Sheep numbers are falling globally - New Zealand has seen a 11.2% drop in breeding ewes in the2006/7 season; Poland had a sheep population estimated at 5 million in 1986 and this has fallen to just 330,000; and in Uruguay sheep numbers have fallen from 22 million in 1990 to 10.8 million in 2007. Many markets I studied were dependent on the export market which created a focus on market demand and an ability to adjust quickly.

In the UK, we have a population of 60 million on the doorstep. Our varied native breeds also provide us with a range of marketing opportunities.

Commodity markets are becoming increasingly volatile but, by using improved genetics and fodder management, the margins for beef and sheep enterprises can improve. In areas where grass based systems dominate.

Attention must be paid to trace element management in association with optimising soil nutrition.

In all the countries I visited it was evident that the most successful producers were those who gave significant attention to detail.

3. Scope of Study

This report concentrates on the opportunities available to a hill or upland beef and sheep farmer for improving their existing enterprises i.e. the cost saving and added value opportunities for beef and sheep production.

The study focused on production in hill and upland areas. The current consultation on changing the LFA's (Less Favoured Areas) and possibly replacing them with a 'High Nature Value' payment is a moving target which could affect the way farmers choose to adapt their farming practices.

4. My background

Having been brought up on a small family farm in North Wales, where both my parents worked off the holding, most of my weekends as a child were spent on farming duties. I am not sure if this was through force or my own choice, but one thing I do clearly recall is that it didn't take much persuasion for me to get into my wellies.

It wasn't until 2000 that I decided that the mule sheep flock would have to give way to a purebred flock – a decision taken at the time because of the risk of bringing in disease and the difficulty in sourcing stock that suited our system. I decided to establish a small flock of Lleyn ewes.

Why Lleyn? I was impressed with the ease of management, prolificacy and quality of the finished lambs (in terms of kg per ewe). The system was based on producing R3L lambs at a target dead weight of 18-21kg rather than fewer lambs of a better conformation. My closed flock is now entering its fifth year of performance recording with Signet and I am a member of the Llywio Lleyn Sire Reference Group where we exchange genetics to ensure strong linkages for recording purposes.

We also run a small number of suckler cows and finish our own and bought-in store cattle every year. With the benefit of a small abattoir in the local town we slaughter and sell a small number of sheep and beef animals every year. This area of the business could be developed further.

5. Work and experiences

I graduated from Harper Adams, having undertaken the Rural Enterprise and Land Management course. I then joined Norman Lloyd & Co, Chartered Surveyors and Auctioneers in Mid Wales; moved on to broaden my experience and worked as an Assistant Land Agent for the National Trust in North West Wales and then in 2002 started work for Flintshire County Council managing their smallholding estate until November 2008.

In November 2008 I took up a position as an Agricultural Banking Manager with HSBC in North Wales. Nuffield allowed me the opportunity to become fully immersed again in agricultural production which undoubtedly opened up new career opportunities and helped me to identify how I could contribute back to the industry.

WHAT IS POPULAR IS NOT ALWAYS RIGHT
WHAT IS RIGHT IS NOT ALWAYS POPULAR

6. Reason for Study

The principal reason for the study was to examine if there is a future for the hill and upland suckler beef and sheep sectors if they rely solely on the market for their income. Both sectors have seen volatile years and struggle to cover their cost of production. My aim was to investigate the opportunities that exist to assist producers to reverse this trend.

Disease outbreaks have made it difficult to market stock leaving producers often as price takers rather than price makers. I needed to establish what opportunities producers in other countries have identified to sustain and increase their returns. There were many questions I hoped to address:

- Are they communicating with their buyers in a constructive way to address cost of production issues and what is a reasonable return for a stable and sustainable industry?

- Is it a viable option for the long term interest of the whole industry, from producer to retailer, to have so many producers selling a product to a diminishing number of buyers and retailers?

- It may be the case that we need a cyclical pattern for livestock returns in order that the weakest performers are weeded out at the bottom of every cycle?

- Is this really necessary, and can it be avoided?

I also wanted to establish if there were advanced breeding tools that could be utilised to improve and guarantee meat quality for the benefit of the producer and consumer. This would ensure that a retailer continued to provide shelf space for a quality product.

When considering the price per kilo of finished stock in the UK there can be a vast different in price between a ‘dual purpose’ animal and a near purebred terminal sire. The sale price may be much higher for a terminal type, but is it the most efficient animal for the industry? I hoped to establish what action was being taken in other countries in relation to their breeding strategies. We have favourable conditions in the UK for grassland production and a very large consumer market right on the doorstep – sounds like the perfect combination for a thriving industry. Are we making the most of this opportunity?

I also needed to understand why traditional (British) breeds of beef are the dominant breeds in the main overseas beef producing countries which still keep only a relatively limited number of the continental type cattle that are now the majority breeds of choice for farmers within the UK. Does this mean that for upland suckler producers there could be unidentified benefits within the traditional British breeds?

Ever since my work placement year from Harper Adams with auctioneers in Mid Wales, I have asked myself what is the most efficient way to produce R3L 38-42kg lambs - the ideal UK supermarket lambs. Is there an easy answer?

How can we ensure that we are improving the performance of animals efficiently without losing the maternal traits or general constitution of the breeds that are required to survive in what are sometimes hostile hill and upland environments?

Secondly, as a Land Agent for a County Council Smallholdings estate providing opportunities for new entrants into agriculture I was keen to investigate how other countries are securing a future in farming for their next generation. Are there non-traditional ways for new entrants to find a foothold on the farming ladder?

The County Farms system is accepted as one of only a few traditional tenanted routes for new entrants into farming. This system is increasingly under pressure, with the pressure to release capital funds for investment elsewhere within Local Authorities. Even where Authorities are retaining estates it is not always possible to retain funds for re-investment. I wanted to establish what other forms of land tenure could provide opportunities for new entrants.

This range of questions means that I may repeat within my report findings similar to those of previous Scholars which are yet to be fully adopted, or state findings that re-affirm what others in the industry are already promoting, but my focus is on the specific hill and upland industry sector.

7. Countries Visited

In deciding on the countries that I would visit to undertake my study I considered three key areas:

1. The competition from South America, especially their low cost beef production. As both Brazil and Argentina are such vast countries, I decided that Uruguay was the most suitable option to get a broad industry insight within the period of time available. I also made a short visit to Argentina.

2. I needed to see the technological advances and tools being used to further sheep and beef production and efficiency. Due to the significant amount of work being undertaken on breeding and efficiency, especially in lamb production, New Zealand was selected.

3. The potential for increased production and competition to the UK red meat industry from Eastern Europe meant I felt I should visit Poland.

7a. Uruguay

Situated in the South American pampas between Brazil and Argentina, Uruguay has a population of just over 3 million people and its area (176220 sq.km) is nearly identical to the UK. The maximum distance across the country is only 412 miles. 80% of the land area is dedicated to livestock production (10 million sheep and 11 million cattle) with four fifths of all cattle based on British breeds. Meat and wool production has a long tradition in Uruguay. Both sectors represent the basis of the Uruguayan agricultural industry. More than 70% of the beef produced is exported, and together with wool, sheepskins and sheep meat, accounts for over 25% of the total national exports.

The Government owns land and lets farms out on a basis similar to the County Farms structure in the UK. The surplus from the business is used to finance developments to improve the efficiency of the industry as a whole. The sheep industry is based mainly on the Corridale (70%) which is a breed produced specifically for wool and there is no significant culture in producing lamb or sheep meat for export in Uruguay. However, sheep meat production amounts to 122,000 tonnes per annum and Uruguay still ranks 3rd for world sheep meat exports. Studies in Uruguay had shown that it is less efficient for them to produce a dual purpose sheep. A specialist wool animal could produce $60 of wool each year and a specialist meat producing ewe could again produce $60 of meat per year however the best of the dual purpose sheep would only produce a total of $55 for wool and meat. The vast estancias pay their workers partly with home killed sheep meat. The owners live in the cities / towns and spend around 2/3 days a week on the farms. Significant work is being undertaken on product differentiation and value-adding within the beef industry. Beef production totals around 590,000 tonnes per annum.

With a temperate climate, similar to New Zealand's North Island, new varieties of clover are increasingly being used and perform very well. I was surprised to learn that perennial ryegrasses are not grown, due to the vigorous clover growth that over run the ryegrasses. According to Diego Paysse, only around 20/25% of the pasture is improved in Uruguay.

The biggest problem for cattle farmers was bloat, the largest single factor for deaths on beef farms.

In recent years, there has been a shift in land use patterns, with livestock (breeding beef and sheep) being moved off land to be replaced by eucalyptus. The trees provide timber for the paper mills with some of the better ground that would have traditionally been used to finish cattle now being continuously cropped with soya.

There are a great number of small co-operatives that are represented at the Ministry of Agriculture by CAF, an umbrella body for a great number of co-op's in Uruguay. According to Juan Pedro Houine, the immediate past president of CAF, a restricting factor for the development of an intensive sheep industry is the rustling of sheep in and around many of the villages and towns. It is estimated that 20% of Uruguay cannot be used to keep sheep due to rustling.

Uruguay is very reliant on the export market. With this in mind, students study the Economy and International Markets at University, with many spending a period of time abroad, usually in North America, Australia and New Zealand. The people that I was fortunate to meet were very well informed about the world economy and foreign affairs. CREA is a not-for-profit organisation which supports the development of agriculture through discussion groups and in assisting farmers access technical information. It also helps secure the best return for their members' produce. A key mission is to get farmers to set goals and objectives for their business and monitor their performance.

Following Foot and Mouth Disease (FMD) in 2001, which devastated the industry and the economy, farmers have become far more risk averse. Around half the livestock is now sold through video auctions, although finished animals tend to be sent direct to slaughterhouses. Half of the Uruguayan slaughterhouses are now in Brazilian ownership. The meat industry was working on meat tenderness, taste and the correlation between meat colour, pH and taste with the industry adopting the Genemark test for beef quality.

SUL, which is the main private wool growers association in Uruguay, manages the majority of research and development, including the grading of wool. Historically, 1kg of wool would sell for the equivalent of 6kg of meat. By 2007 this figure was down to 1kg of wool being the same value as 2kg of meat. The same quality wool as that produced in Australia returns much less to the Uruguayan farmer. The reason given for this was the lower number of active competitive buyers. The market for the wool produced has weakened greatly, but they are looking to further develop the fine wool industry.

Currently, external investors are key to change and the development of the agricultural sector in Uruguay. UK investors have established an abattoir in central Uruguay and they had also acquired the brand for the 'Hereford Beef from Uruguay'.

Investors from New Zealand are buying farms for dairy production under the banner of NZ Farming Systems Uruguay Limited which is managed by PGG Wrightsons Uruguay Limited. The farms have been established to mirror dairy units in New Zealand and similar returns are expected. The success of these ventures will depend on how these commercial concepts fit in with the culture of the country and its people.

7b. Argentina

The price of beef is a key political issue in Argentina as the average consumption of beef per head of population is close to 74kg. Any sudden increase in beef prices has an inflationary effect on the economy. This consumption figure compares to 6.3kg of beef and 3.2 kg of lamb per person per year in Wales. *Source: TNS world panel 2006.* While the current government policies of high export tariffs for exporters of agricultural products from Argentina continues, expansion will only occur in certain sectors, such as soya which offers the greatest returns. FMD is still an issue in certain provinces. On the Pampas more land is moving into the growing of soya so cattle production is being pushed onto poorer land and this has led to a change in the cattle breed being used. Instead of pure Angus or Hereford herds, Bos Indicus (Braham) bloodlines are been introduced as the animals need to be more disease and heat-stress resistant. Juan Galli stated that a minimum of 3/8 of Braham blood is now necessary, which provides benefits to the animals but does not lead to a detriment in meat quality. The mature target weight of cows is 400-450kg with the target weight for bulling heifers at 350kg, and 420kg by calving. The average weaning percentage for cows is 74%, with the best averaging over 90%.

Argentina has a wealth of natural resources, especially the vast amount of fertile agricultural land on the Pampas, but it has limited access to the investment capital needed to develop its industry. It will therefore remain a sleeping giant of the world's countries with great potential to export quality and low cost produced food. Although investment capital is limited, farmers in Argentina are very focused on production efficiency as government policies are forcing farmers to be efficient and innovative.

7c. New Zealand

Without any support payments to rely upon, producers were very aware of their cost of production and would seek out tools to continually improve their efficiency and reduce business risk. Estimated Breeding Values (EBVs) are seen as a "must" in selecting stock sires. Animals must have good conformation, but the emphasis is on genotype with phenotype. An animal with greater profit potential will always be selected before a better looking animal with inferior genetics.

Gene markers are increasingly being used to identify stock carrying economically important traits. The Myomax muscle gene marker in sheep is widely used, while the worm resistant and foot-rot gene markers are seen as important, when they become available. There is a significant amount of research identifying and commercialising these economically valuable gene markers.

Food conversion and meat quality markers are seen as important tools that can assist the efficiency and consistency of beef quality in cattle.

Genetics are selected to drive performance solely from pasture. Legumes are widely used along with alternative forage crops such as chicory. Pastures are managed intensively with small paddocks on a rotation system, based on the available DM (dry matter), being as popular with sheep and beef farmers as in the dairy sector.

At the time of my visit in December 2007 there was extremely high confidence in the dairy industry with over 300 dairies starting in the spring of 2007. Cow prices had trebled in six

months and farm prices were shooting upwards. Sheep and beef farmers were seen as the poor relations. With returns for sheep farmers being poor in recent years, there is a decrease in the number of the breeding flock.

The table on the next page uses figures produced by Meat & Wool New Zealand economic service to illustrate the change in lamb production. This provides a guide as to the number of lambs retained as replacements which will also affect future production.

Table 1: Lamb Statistics: New Zealand

Export Lamb Production				
Sept Year	**Lamb Crop (Million)**	**Slaughter (Million)**	**Carcass Weight (Kg)**	**Production(000t) Bone-in**
2003-4	31.9	22.9	17.43	399.3
2004-5	33.2	24.0	17.54	420.7
2005-6	33.8	25.4	17.17	436.4
2006-7	33.0	26.5	16.90	448.4
2007-8 estimate	31.9	26.4	16.44	433.6
2008-9 forecast	27.6	20.3	17.38	353.4
Source: Meat and Wool New Zealand Economic Service *Statistics New Zealand* *New Zealand Meat Board*				

As the number of breeding ewes is falling there is a need to rationalise the processing industry due to over capacity. Producers were focusing on delivering the product as demanded by the market, as efficiently as possible. The vast majority of sheep breeds are bred pure, or as a composite, with very little use of the stratified crossing system as widely seen in the UK. Most crossing is undertaken to produce prime lamb or to develop composite breeds or to introduce new genes into a breed (such as Myomax). Viascan grading technology is increasingly being used in abattoirs, with some plants using the system to reward producers for lambs of greater meat yield. This information can also be utilised to identify sires and dams that produce the best progeny.

The average price per lamb received by producers in 2006, 2007 & 2008 was only NZ$55 per lamb, with the average sheep farmer's income at NZ$19,400 in the 2007/8 season compared to the average Fonterra dairy producer receiving a payout of nearly NZ$900,000 in the same season. It is worth noting that the New Zealand farmer typically receives 20% of the retail value of the meat sold.

The beef industry is based mainly on dairy production and greater returns in the dairy sector showed signs in some cases of shifting to a higher production cost structure to chase marginal litres. As previously described NZ investors are driving investment in other countries such as Uruguay and are actively pursuing opportunities in Asia to ensure a growing market for their products.

7d. Serbia

There are nearly 780,000 agricultural units in Serbia *(2002 census*). With an average unit size of 3 hectares split into seven parcels this makes the farm size in Serbia the smallest in Europe. Over eighty per cent of the land is privately owned and it was quoted to me that

the average age of a tractor was seventeen years! In 2007, stock numbers were estimated at 1.1 million cattle and 1.55 million sheep.

Serbia is not a member of the European Union (EU) although it does have preferential access to the EU market. Between 2000 and 2006, exports to the EU grew at an average of 20% per annum. Serbia also benefits from very low labour and land costs. It is a country of contrasts that offers huge agricultural growth potential. The main Serbian products imported by the UK are frozen raspberries and blackberries. It has developed specialist produce markets and these were grown in the fertile areas that I visited in Vojvodina around Novi Sad.

Serbia is well located to develop an export market for red meat to southern Europe and Turkey, although security issues in rural areas currently restrict development of extensive grazing systems with most livestock being locked indoors overnight. There is significant demand for breeding stock in Serbia, as producers are aware of the improvements they can make by introducing new breeds. There is considerable scope to develop markets for selling breeding stock to this part of Europe once certification schemes have been set up. Most farmers live away from their land, in order to be close to local services. Due to the numerous small parcels that many own the scope for developing large scale livestock systems in the Vojvodina area is limited.

7e. Poland

Poland has a large proportion of its population still involved in agriculture. There were 1.1 million farmers in Poland compared to just over 38,000 in Wales in 2007 (*WAG Farming Facts and Figures 2008*) and approximately 312,000 holdings in the UK in 2006 (*Agriculture in the United Kingdom 2007*). The average size of a farm in Poland is 7.8 hectares. Pork is the main meat consumed in Poland. The sheep sector has contracted, there are only 330,000 ewes now compared to over 4 million in 1990. There is no home market for lamb or sheep meat and only a small market for beef, although initiatives to develop the beef sector are underway. 90% of the beef derives from the dairy sector. There are only 694 pedigree beef breeders in the country (*Simon Gill 2008*).

A project funded under the EU Rural Development Plan called Quality Meat Poland is aimed at improving the whole beef production chain. There are vast areas of hill land in the south of the country that are undergrazed and three quarters of the land area is defined as LFA. Land prices were rapidly increasing at the time of my visit in May 2008. A market exists for breeding livestock exports from the UK into Poland subject to disease restrictions. At the time of my visit most of the imports were being sourced from Hungary, Austria and Germany.

Having visited these countries, it is clear that tradition, culture and religion greatly effects their agricultural practices.

8. Findings and Opportunities for UK producers

The opportunities identified that could improve UK industry efficiency and financial returns were to:

1 improve the **breeding** of animals

2 improve the **feeding** of animals

3 improve the **marketing** of livestock

There were many challenging questions and sometimes harsh realities to face during the study. Some have not been answered fully and new solutions will be found to others as Government Policy and consumer trends evolve.

- Is there a future at all for hill and upland producers without external support?
- What future is there for sheep farming in the UK?
- Should producers in Hill and Upland areas be trying to finish so much stock?
- How can we improve efficiency and improve knowledge transfer within the industry and along the production chain?
- How do we inspire production of a consistent product that can be finished to the same standard at least cost to the finisher?
- How can UK producers best add value to their products?
- What is the most efficient and cost effective way of advancing the genetic capability of a flock or herd?
- How can producers improve their share of the retail value of meat, while minimising production costs and maximising the best 'non-food production income'?

During my travels it became apparent that farmers in an unsupported agricultural industry have to farm in a very different way and with a different mindset to those who have the safety net of a guaranteed market or annual support payments. Where producers did not receive any government support, the differences were readily apparent.

9. AN OUNCE OF BREEDING SAVES ON TONNES OF FEEDING

9a. Breeding

Breeding is a science not just an art. (*Robin Campbell, Winton, NZ*). It is also the most difficult to assess as its impact isn't as apparent as feeding or marketing strategies. Genetic improvement also takes time so if you wish to improve the performance of animals it is imperative that you use the tools available to make objective measurements at the earliest possible opportunity. The benefits then compound from generation to generation. Sheep of poor conformation or inferior genetics should never be retained for further breeding. Trying to improve many traits at the same time will take longer than focusing on one or two key traits where genetic progress can be made very quickly. As an industry we need to decide which of the many traits must be prioritised and focus on improving those first. The importance of selecting sires is illustrated below (Figure 1). However it is worth remembering that every sire has also received half his genetics from a female, and that the female line is as important in the make-up of each sire. The speed of genetic improvement within a flock will double if ewe lambs are mated rather than being left to lamb as shearlings.

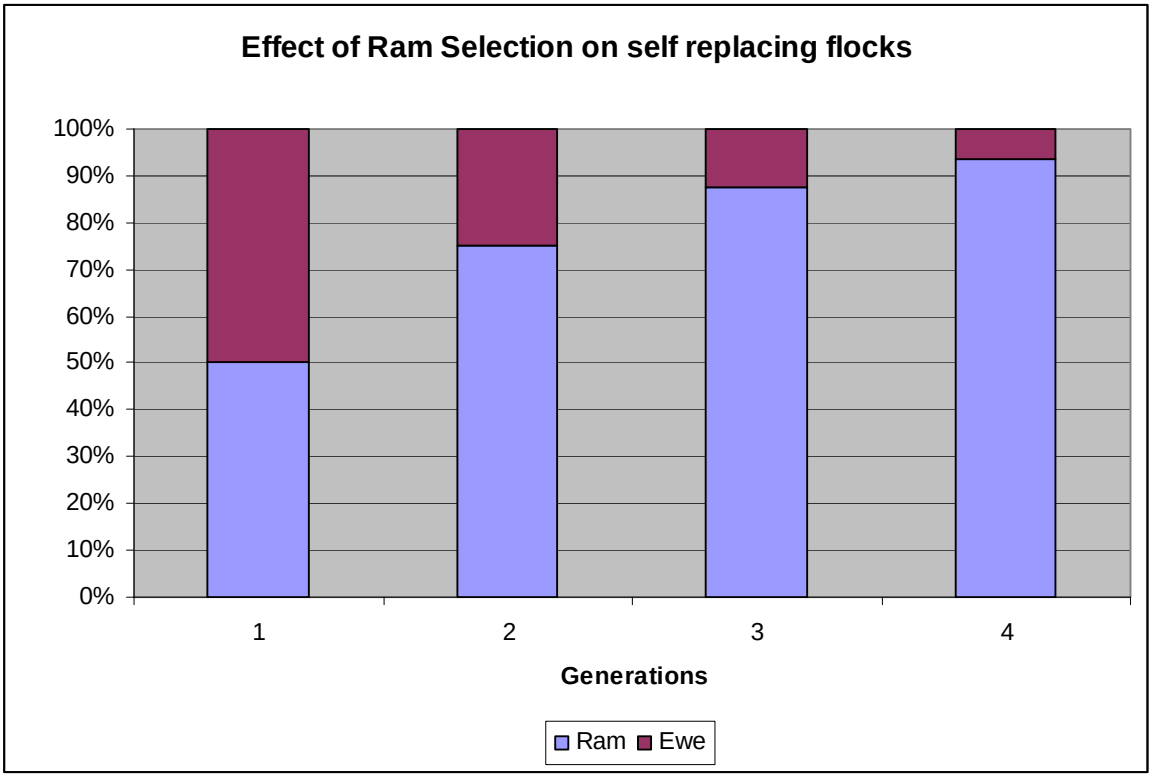

Figure 1 – Effect of Ram selection on self replacing flocks.

Most of the countries visited showed a similar breeding structure pattern (Figure 2). It is therefore very important that the top seed stock producers and breeders use all the genetic selection tools available that will assist the industry.

9b. Maternal Traits

The beef and sheep industries in Uruguay, Argentina and New Zealand focus on the reproductive qualities of stock. Great emphasis is given to ensuring that only the best performing genetics are retained for further breeding. These traits include ease of calving, mothering ability (weight of calf or survivability to weaning) and fertility measured by the cow being in calf for the following season (after 2 cycles with a bull). A significant amount of detail is available on the birth weight of calves and length of gestation which will prevent calving difficulties.

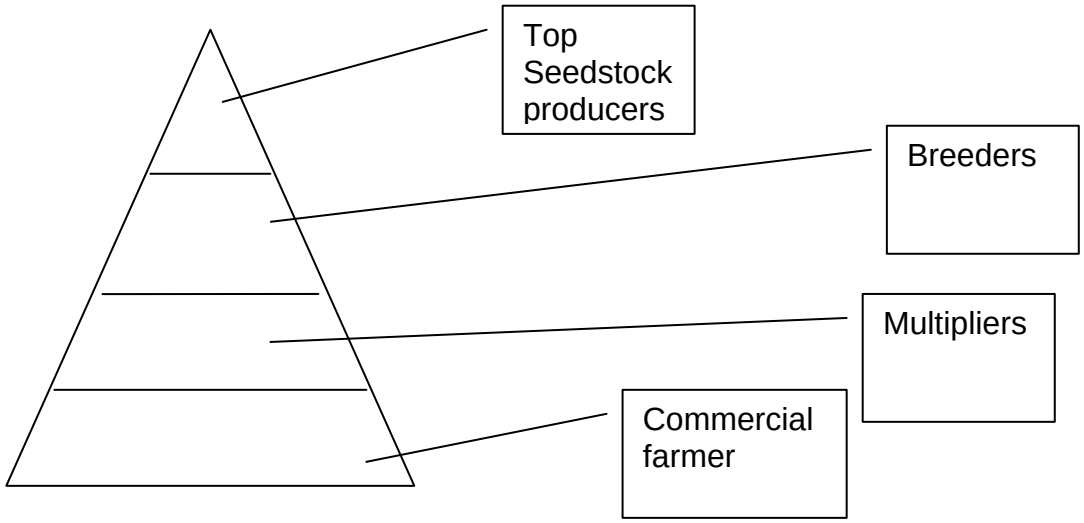

Figure 2 – Dissemination of Genetics.

The terminal sires in the sheep industry are based on the shape of “3 wedges”. This ensures that they lamb easily but without losing length over the loin or conformation in the hind quarters. The Texel sheep that were inspected in Uruguay and New Zealand showed far greater maternal strengths and were finer boned and narrower in the head and shoulders than the show type that is so familiar in the UK. With large gene pools breeders are able, where performance recording takes place, to identify and make use of the best genetics to improve the performance of the industry as a whole. It is the seed stock producers that invest in the genetic improvements through performance recording work and using any gene marker tests that are deemed beneficial. The focus is on the female line traits within self replacing flocks or herds.

9c. Eating quality

Breeders in South America and New Zealand were utilising the latest technology to identify the animals with the potential to produce the best quality meat. Meat quality is considered an important factor in a breeding programme for meat producing animals, far more important than extreme conformation or muscling.

9d. Producing "off pasture"

It is very important that sires are raised and performance recorded in a similar environment to the one they would be expected to work in. There is little point in expecting a high performing animal on a quality diet to produce progeny that will perform to the same level on a different diet. Genetics of ruminants should be selected to perform "off pasture".

9e. Hybrid Vigour

Hetrosis has been exploited in livestock farming for generations. Composite breeds aim to lock in the benefit in their F3 crosses in order to obtain a genetically superior individual by combining the virtues of its parents. In a stratified sheep breeding programme, there will be no guarantee that the mules or halfbreds are of the same or improving quality unless the seedstock used for their production is also being developed. Over 60% of the Welsh flock is bred pure. It is therefore important to ensure that genetic gains are being achieved within these flocks. It is also important to consider if it is in the best interest of the industry to continue to rely on the stratified system for the female replacement ewes, especially at a time when hill ewe numbers are falling so fast.

The role of hybrid vigour is probably overrated (*Richard Wakelin, M & W NZ*), a view shared in the wider industry in New Zealand. Hetrosis is seen to have a greater effect with traits of low heritability such as litter size. As the stratified breeding system is likely to remain in the UK for a number of years, improvement needs to be targeted at the hill and upland purebred sheep as well as the crossing sires such as the Leicester or terminal sires.

9f. Performance Recording

Breeders must provide genetics that will increase the customer's profitability. This will promote a secure and confident client base. Using the best genetics will over time improve the performance of whole flocks – and the initial gain can be rapid before levelling out at around 5% per annum. The effect of selecting the right sire should not be underestimated. Estimated Breeding Values (EBVs or EPDs) must be a consideration in selecting stock sires. Litter size has a low heritability, but by using EBVs, litter size can be easily managed to suit your farming system. Obviously animals also have to be structurally correct and appealing to a breeder's eye, but the emphasis should be on genotype with phenotype. The use of an across breed recording system can also provide a breeder with an useful tool for the benchmarking of his flock's potential performance such as the ACE list that is used in New Zealand.

It is the fifth year of performance recording for my own flock (Figure 3) and progress is slowly being made. In Wales, the performance recording service is largely subsidised by HCC (Meat Promotions Wales) but the uptake of the service by farmers has been disappointing. In the UK, breeders work together in sire reference groups to ensure strong genetic links between flocks and to have the benefit of a larger pool of genetics to apply selection pressure in deciding on future sires. More purebred flocks should be undertaking performance recording and using all the available tools to ensure the continual improvement in the efficiency of their production system.

As we have so many breeds in the UK, there is no need to acquire new breeds form overseas, it is more important to use the tools available to identify the best performing genetics for our own environment. I was fortunate to spend a day with Derek Daniels at Wairere, North Island NZ. They were achieving 180-190% weaning percentage from their Romney ewes on improved hill country. It demonstrated that these excellent results are achievable even in difficult conditions. These statistics are the result of many years of genetic improvement through objective measurements.

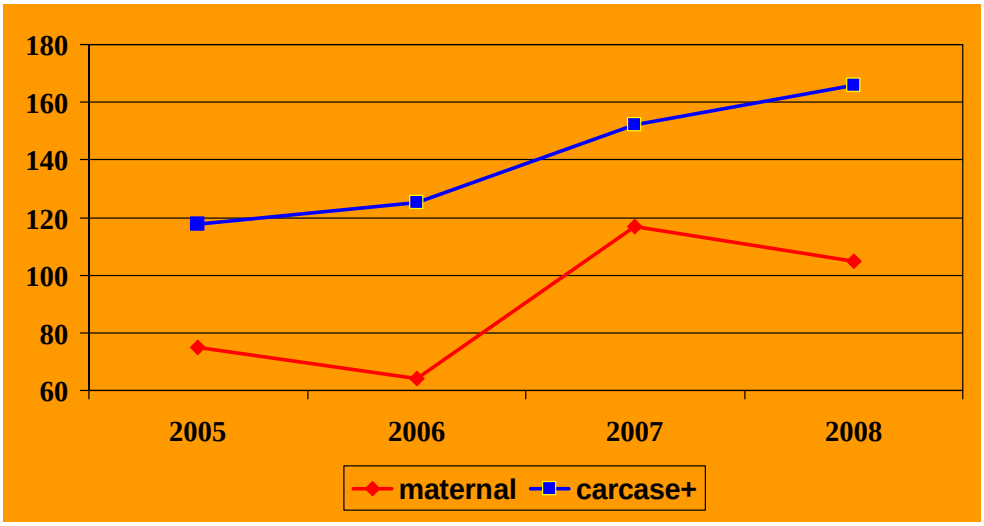

Figure 3: Performance records for Lleyn flock 1167

10. Objective measurements to identify performance traits

Through using a core flock and then using the best genetics on the rest of the flock, controlled improvement can be made within that flock. In Uruguay simple measurements, that had a high correlation, were used to identify the best performing animals such as measuring lambs from last rib to tail, not from shoulder to tail, as this would provide a guide to which animals had the longest loin. Skin thickness was also measured, as this indicated the sheep with the finest wool. Other objective measures are also used and I describe these below.

10a. Three T's

The structural soundness of animals is clearly important to ensure longevity; the three T's being teeth, teats and toes. To last, rams need to be reared from forage, and not pushed excessively as young sires. A ratio of 100 ewes to a ram, and up to 180 is achievable and such a ratio ensures that if a ram of known high genetic merit is used the genetic progress within the flock will be quicker.

10b. Gene markers

Gene markers are increasingly being used to identify stock that carry what producers consider to be economically important traits. The GeneStar markers are becoming very important in countries that value the quality of the beef meat produced as opposed to the shape of a carcase produced. Gene markers have a role to play in improving objective selection of stock, however, breeders and buyers need to fully understand what, if any, benefits the markers can produce. Fertility genes have been identified and have a role to play in increasing the litter sizes Of these, the one currently available on a commercial basis in the UK is the Inverdale Gene. It's main advantage being that high conception rates can be achieved even in negative flushing situations. The gene increases ovulation by 1 egg per ewe per cycle. Other genes that have also been identified and with differing level of effect on ovulation rates include: Woodlands – the mean effect of the gene on ovulation rate being (+0.39), the *Booroola* (+1.65), *Java* (11.30), *Cambridge* (+1.25), and *Olkuska* (+0.70) (Source: Davis et al., 2001)

Agresearch in New Zealand were undertaking research into embryonic survival. The results could assist in identifying strains of sheep that wean greater number of lambs (hence kg of meat) from the same rate of ovulation, by limiting ovulation but aiding survivability. The aim was for an ovulation rate around two with the aim of weaning 1.9 lambs per ewe with lambs weighing a total of 4kg at birth. It is recognised that too many multiple births will create additional demands on resources from pre lambing to selling of lambs through increase feeding pre-lambing to the management of more groups. Through utilising performance records and the appropriate gene markers sheep breeders can, by culling sheep of undesirable traits (such as lameness, difficult lambing, mis-mothering and unsuitable litter size),rapidly develop, with the use of the currently available breeding tools, the performance of their flocks.

11. Feeding

The feeding of livestock is clearly as important as genetics to get them to reach marketing condition as quickly and as cost effectively as possible. A well bred animal, needs to be appropriately in order to fully express its genetic potential. There is no logic in breeding animals with greater feed requirements than can be provided economically in the market place. The potential for the increased use of legumes and crops such as chicory has shown many benefits which should be explored further by the UK upland and hill farmer. There is little need to plough land to improve pasture, but instead over seed or direct drill as it can be far more cost effective and retain organic matter in the soil. Better forage planning and management will increase efficiency, save costs and aid the cash flow of a business. Deferred grazing systems have shown cost savings, especially for labour. To achieve optimum livestock performance, the mineral and trace elements balances should also be regularly monitored and supplemented as necessary. Consideration should be given to breaking fields into smaller paddocks which can then be intensively grazed for short periods of time, with the benefits of reducing selective browsing and waste together with having a clean pasture to regularly move stock onto, which should improve worm burden and foot-rot control in sheep.

12. Marketing

The marketing of livestock can be broken down to two main areas namely the sale of:

1. Breeding stock

2. Meat Products

Breeding companies are becoming popular across the world and to a degree they are taking over from traditional breed societies. In Argentina, I visited the Las Lilas bull stud operation. The company has around 40,000 cows and sell their own-brand beef as well as being a supplier of top cattle genetics. In NZ there are numerous composite sheep breeding companies together with established Romney pure bred flocks such as the Wairere that are providing crossbreeds for various production purposes. These include composite breeds such as the Kelso, the Rissington (Highlander and Primera), TEFRom, and the Textra to name just a few.

Rissington Breedline was also breeding and supplying Stabiliser and Simmental cattle and had expanded its market to the UK working with the supply chain to supply year round lamb to M&S stores. This was a very impressive concept and the model used has potential for the wider UK industry. The franchising of composite breeds is also a method that is increasingly being used. What impressed me about NZ was how the successful businesses were marketing their stock and creating new openings. They worked with others to secure a market for their products even selling a share of the business to access that marketing expertise.

Producers are increasingly targeting niche markets. This includes branding such as organic, natural (grass finished), grain fed or on a local or regional basis. In Uruguay, the promotion of the beef was based on each animal having the equivalent of 2 football pitches to graze; an excellent example of trying to connect with the consumer. There is a clear move away from the traditional meat cuts, with processors increasingly seeking to add value to carcasses by introducing new cuts and placing far greater emphasis on meat quality and the eating experience. In the future, there is no doubt that we will need to give greater attention to customer requirements which are likely to include, meat tenderness, meat colour (pH) and taste. The marketing of the meat on the shelf will start with the breeding as has happened with Hereford and Angus cattle, and also to improve consistency as seen in the pig and poultry industries. We should also remember that the skins and offal might only be a small part of the price of a slaughtered animal, but they can still add significantly to the bottom line.

Unless the customer is willing to pay more, or processors and retailers improve their efficiency to ensure a fair return to the producer, the whole red meat chain will lose out as we are already seeing with globally reducing sheep numbers. Producers will not continually produce at a loss. With highly fluctuating input costs and uncertainty that market returns will cover the cost of production, producers will need to get closer to the consumer to remove some of the risks associated with operating in such volatile commodity market conditions.

It is also questionable if the marketing of sheep meat as “lamb”, is the right description for a society that probably has the image of a lamb as a small cuddly animal. Historically,

there was regular choice between lamb and mutton too. To change a product's description will take time, but there is an opportunity to open up new markets. The past experience and image of mutton is also a restricting factor in marketing sheep meat in many countries. We need to be aware though that different cultures and traditions demand meat in different forms and for social celebrations and religious festivals.

Most countries have a low number of breeds based on one or two main breeds, and very similar production systems; therefore most of the lamb and beef will be very similar in size and quality. In the UK we have a population of over 60 million, a huge market on our own doorstep compared to producers that have to rely on the export market for their produce. Exporting countries are focused and adjust to meet market demand in their import countries. They also tend to have a small number of main breeds, usually around five, while there are over sixty recognised pure breeds in the UK. This creates the opportunity to specifically market our regional and local breeds to a variety of markets.

Production and marketing could be better co-ordinated to manage supply and demand so that prices can be maintained. If as predicted the supply of lamb and red meat is to become tighter in the immediate future our focus should be on supplying quality (and higher margin markets) rather that than the quantity low-margin market.

13. Livestock Markets

Livestock markets have a strong tradition in most livestock producing areas of the UK and have a key role to play in providing a platform to showcase quality presented stock. What role do they play in promoting breeding stock genetics rather than visual appearance? They provide an assembly point for the exchange of genetics but the sale is struck more on the phenotype than the genetic constitution of the animal. Auctioneers in the UK are generally held in high regard by the farmers that present stock through their auctions. For the long term sustainability of the industry it is also in an Auctioneer's interest to make sellers and buyers aware of the commercial advantage of one animal over another, with particular reference to performance records. In most of the countries visited the failure of livestock auctions to fully utilise objective information in selling livestock and their being unable to provide feedback on the killing out performance of finished animals has resulted in the majority of livestock now being traded through stock agents direct to buyers. The use of electronic tagging in sheep could assist the industry to improve its productivity if systems could be implemented that provided feedback to the producer from along the food chain.

14. Government Policy

Devolved, UK and EU policy will have a significant effect on the future viability of hill and upland beef and sheep farming and on the opportunities available to new entrants. In the future there is likely to be even greater interest by government in utilising these areas for carbon storage, renewable energy production and for water management as well as sustainable food production. Producers need to be alert to the opportunities that will arise and take advantage of these when they will support their farming enterprises. Where the export of farm produce is a major source of income and foreign currency to a region governments seem to work more closely with their producers and processors to access and retain markets. Many countries are now seeing the benefit of adding value to their produce before it is shipped as it in turn provides additional income in the form of inward foreign currency.

15. New Entrants

In all the countries visited while undertaking my study the issue of the gateway for new entrants into the industry was a common concern. The average age of farmers is high in most countries and succession planning for family owned businesses is not being given the resources that it deserves. There is no doubt that, as a general rule, not providing young entrants or younger family members the opportunity to be involved in managing an agricultural business at an early age is restricting the competitiveness of agriculture in the UK. It is also evident that the number of opportunities available vary according to the tax and inheritance laws in the different countries. In the UK it is more likely that new entrants have to initially follow a career in order to build up capital to be in a position to acquire land or take on the tenancy of a holding, rather than start on a very small farming unit and then seek opportunities to expand. New entrants could gain experience managing farms for large companies, but such companies are very few in the livestock sectors in the hills and uplands. New entrants to the sector are more likely to be innovative and open to new concepts. When drafting new policies that will have an effect on agriculture, government should, for the long term interest of the whole industry, always look at how such policy will affect new entrants to agriculture. Policy should be set to help our able and enthusiastic future producers.

Focus needs to be provided for producers sharing resources and working as groups to either procure or market produce to ensure that they secure the best possible contracts as well as setting out to young entrants the various ways in which they can nowadays occupy or manage land (see next section). Membership of discussion groups should be encouraged, even made compulsory, as this is recognised as one of the most successful ways of transferring information. Succession advice is vital to allow family businesses to plan ahead - and it will be necessary at times for a facilitator to become involved to ensure that there is a successful outcome. Transferring a business is a very complex matter and there is a need for professional support to facilitate the transfer (e.g. solicitor, chartered surveyor, accountant etc) and to ensure that the business does not lose out during the transition. Tax incentives are clearly one way of creating new opportunities for new entrants - either linked to the retirement of a farmer, or to allow an investor or landowner to have some benefit for having let the land to a new entrant. In Poland and in the Republic of Ireland funds are provided to new entrants, subject to qualifying criteria, but with no need for them to demonstrate how the money is to be spent. In Northern Ireland, the scheme aims to encourage succession of the farming business, although with no obligation for the ownership of the land to be changed. The applicant needs to be appointed as head of the holding and has to be eligible for at least 51% of the profit from the holding. There has been £17,000 available for each applicant to pay for loan charges. This has allowed applicants to access between £50,000 and £60,000 of capital to undertake on farm investment. Between June 2005 and end of 2008, around 285 applicants will have qualified for the NI scheme and the budget of £4.5million will have been utilised.

Whilst we have in the EU the single farm payment system, there should also be a New Entrants Scheme. Support for capital investment into the business, to facilitate new ideas, has to form part of any New Entrants Scheme – and this can be delivered through grants or tax breaks. Priority should be given to those young entrants looking to add value to their produce and integrate their businesses further along the food chain. Government could also provide assistance to prospective tenants of County Council Smallholdings in

accordance with s53 of the Agriculture Act 1970. Demands on Local Authority resources do not allow them to provide the loans which may have been provided in the past. Different governments within the EU have interpreted New Entrant Schemes, and the benefit of having such schemes, in a variety of ways. Governments in most countries own land and manage it to achieve various objectives. Some seek to provide opportunities for new entrants and to have a greater number of people working on the land. Some focus on the social benefit of keeping a rural population or of providing land for food production. Where agricultural development is key, the government (or a government company) is often at the forefront of investing in new technology and in developing its industries by being seedstock producers and in demonstrating new production methods.

There are vast numbers of non farmers buying land in the UK and this land will need to be managed by someone. In one instance during my study the owner of a large farm had sold 1% of his farming business to his worker and 49% to an investor from abroad. Whilst the owner carried on the day to day management of the farm, he had been able to utilise his released funds to develop other business opportunities.

It was also interesting to learn that the former worker who was now a partner in the business would give so much more to the business. As was stated, it may have only been 1%, but that was all that the former worker owned and it was in his interest to ensure the business was a success. There are numerous options available to formally set up agreements between parties. The list on the next page sets out some of those options:

- Share Farming,
- Contract Farming,
- Partnership Arrangements
- Managers / employed with stake in Business / bonus incentives,
- Tenancies.

Inheritance Laws plays a significant part in how land is passed from one generation to the next, together with how government deal with the transfer of assets upon the death of an owner. In Uruguay and Argentina, properties would be passed to all the children in equal shares, with allowance for the owner to bequeath a small percentage (around 15%) to a benefactor of his choosing. As land passes through the generations this is clearly going to create new challenges for the future structure of their industries with the likelihood of less family owned farms in the future.

16. Findings of relevance to UK Industry

16a. Breeding

- The industry must become more serious about performance recording and using breeding technology to improve the performance of the sheep industry in the hills and uplands. The use of performance recording (Estimated Breeding Values) and gene markers will increasingly become a tool used in cattle and sheep breeding with the use of artificial insemination and embryo transfer becoming even more popular as breeders seek to benefit from the best genetics available. Bull and ram buying decisions should only be undertaken with reference to its EBV's

- All breeders of cattle or sheep visited considered the maternal traits of the dam as a priority in self replacing herds / flocks, while aiming at the same time to improve the growth and carcass yield of the progeny.

- The NZ and Uruguay sheep industries are based on a small number of breeds. The UK has a huge number of sheep breeds and a great variation in the type of carcasses offered for sale. This can make marketing of finished lambs a greater challenge when buyers are seeking uniform lambs of a consistent eating quality, but on the other hand it provides vast opportunities for those breeding replacement stock for the home or export market.

- There is significant investment being made in identifying economically important genes that can identify animals with certain traits. For the sheep industry the establishment of a foot-rot and worm resistance gene has an important role to play while the beef tenderness gene could in the future play an important part in the beef industry too. UK producers should monitor development of gene markers that could identify cattle that have better feed intake and also ones that produce less methane.

16b. Feeding

- All the countries visited aimed to have the majority of animals kept on and finished on a grass/legume diet (mainly grazed). The UK has many benefits compared to other countries with access to capital, consumer market proximity, and a temperate climate that offers advantageous grass growing conditions which should allow animals to fully express their genetic potential at least cost to the producer.

16c. Marketing

- The majority of ram buyers in the countries studied use performance records to support their decisions when buying rams. Currently in Wales despite the performance recording of sheep being funded the uptake is slow, many stopping recording as they do not see the benefit of the work involved. We need to demonstrate more clearly that there is a benefit to improving the genetic base of a flock.

- Most countries rely on the export market to sell their produce – the UK producer has the benefit of having a large market right on the doorstep.

- In most countries lamb as a meat cannot be easily found on the shelves of supermarkets or butchers' shops. Lamb does not have the same following as beef, pork or chicken. It is seen as a luxury meat in many western European countries while in others it is dismissed due to memories of the old mutton that was usually served rather than young lamb. Opportunities exist to develop the red meat supply chain for the mutual benefit of all parties. As an industry we must focus on meat eating quality to ensure that consumers have a consistent product every time. The model developed by the Rissington Breedline is an example of how this can work within the industry.

- Livestock markets and shows provide a fine opportunity to showcase quality stock. Commercial producers need assurances that the phenotype will also deliver on and perform in practice. EBV's can provide this.

- Producers should not be afraid of exporting breeding stock. Indeed, there is a vast opportunity as many areas are undergrazed within the EU. The benefit of the trade depends on the volatility of the exchange rate, but an additional market for breeding stock will help the home market. The countries which may purchase stock are unlikely to be competing with the domestic market for many years as it will take time to develop the infrastructure required and they may well have developed their own markets too.

- British livestock genetics have a lot to offer other countries and breed societies can play an important role in understanding and developing those markets. The genetics exported must perform to the buyer's expectations and the suppliers of genetics must therefore fully understand their customers' needs. Europe offers great future opportunities for high health status live cattle and sheep breeding stock.

16d. New Entrants

- There are initiatives in most countries to encourage and assist young people into agriculture – either in tax breaks, leased state owned properties, financial assistance or in advice during the initial years (a requirement for some lending banks).

- A number of well funded new entrant and retirement schemes exist within other EU countries and tax benefits and subsidised loans with mentoring support are common outside the UK.

- Land ownership or being granted a long term tenancy is not necessary to start up in farming. For new entrants there are opportunities to work with landowners or retiring farmers and manage the assets on their behalf – changes to the tax system could facilitate this quickly and efficiently.

- Government policy on land ownership, inheritance and tax laws are the major drivers at the time of farm transfer in all countries visited and addressing this has to

be part of the solution in attracting new entrants into the industry or encouraging existing young farmers.

16e. Business Planning

- Discussion groups and benchmarking tools are widely used to allow producers to establish how well their business is performing and where there is room for improvement. Progressive producers are members of discussion groups that share financial details and experiences for the mutual benefit of group members

- To ensure a sustainable future for the industry, producers must review their production systems and aim to produce at the least cost possible. To do this producers must understand their costs and the use of benchmarking information is an important tool in this respect.

- It is hoped that under future CAP reform that recognition will be given to producers in those sectors that provide additional benefits which the marketplace does not reward in financial terms, but never rely on government policy, seek to influence it.

17. Recommendations

- Using performance records and gene markers should become a normal part of selecting breeding sires. Breeding should focus on economically important production traits and not show traits solely.

- Breeding own flock / herd replacements should be encouraged to ensure continuous genetic gain within the same environment and to reduce the risk of introducing disease. Rams should be reared on forage and be expected to work over greater numbers of ewes.

- Producers need to secure more involvement along the production chain from gate to plate. UK farmers can invest in improving efficiency on farm, but if they remain price takers there is little incentive for processors and buyers to improve their systems. The industry is being asked to benchmark its system against others. The industry could develop a league table of red meat processors to demonstrate the most efficient (cost effective) ones and which are best at adding value. Co-operatives seem to work well when there are limited options – for example when the market (for buying or selling) is far away and farmers need to work together to access the market.

- Livestock genetics should be selected to perform off pastures. Legumes and alternative forage crops such as chicory need to be considered as part of the grazing rotation. If we don't have the necessary forage profile in the hills to finish the animals, we should be looking for partners who have the land to finish them.

- The use of monitor or demonstration farms and discussion groups should be encouraged wherever possible to facilitate change and demonstrate the benefits of the new systems.

- Carcass yield and meat quality should be part of more objective payments for carcasses in future, as opposed to visual assessment rewarding confirmation and fat class.

- There is a growing market for breeding stock to Europe that needs to be fully exploited to help establish a base to UK breeding stock prices.

- Cattle in the hills and uplands do not need to be finished or taken through to be strong stores. For the beef sector a consistent type of cattle reared on grass in the hills and uplands with a short finishing period (40 – 70 days) on a lowland finishing unit on a diet supplemented with cereals will be an opportunity to link the green image of production from gate to plate, in the most efficient way, as it is cheaper to move cattle to the feed and straw than vice versa, and it allows the calf producer to focus on calf production only.

- The aim of any breeding business should be to provide market leading genetics to commercial farmers that will facilitate them to increase profitability and the use of modern breeding tools should be fully exploited.

- The suckler sector must consider the importance of maternal traits, meat eating quality, mature weight and also the temperament of cattle when breeding replacement cows

- Lamb is a high end protein priced at the top end of the market. Successful marketing as a premium product is to become an even greater part of successful sheep businesses in future. To maintain brand loyalty the industry needs to establish a system to ensure consistent quality of meat produced and sold in UK.

18. Conclusions

- Breeding animals must be selected on economically important traits if they are to maintain or develop their market share.

- Grain feeding of ruminants may not be possible in the future which will create opportunities for the grass based production systems of the hills and uplands. Grain availability and cost is likely to fluctuate more widely that the available grass in our hill and uplands giving the hill and upland production system a stronger case in the debate on food security.

- Optimum performance will only be achieved through understanding and managing available resources and production costs.

- With a large population on a relatively small Island here in the UK, businesses that understand and connect with their customers and end consumers have a bright future.

- Tradition and religion are factors that greatly affect livestock production and consumption, now and in the future.

Appendix 1 – Personal thanks to the people who assisted my study:

Uruguay

Name	Organisation
Pablo and Monica Minelli	Australtours
Dr Emilio Marganelli Costa and his wife	President Corriedale Sheep Society
Alejandro Garofali	Foreign Ministry
Nicolas Marchand	Agricultural Ministry
Juan Pedro Hounie	CAF
Alejandro Tedesco Angulo	Corridale Breeder
Enrique Fernandos (Also met Georgett Banchero Unnziker, Sheep Vet and Ernesto Restaino Galup – Extension Officer)	INIA
Emilio Marganelli	Corriedale and Hereford
Hector Rodriguez	pueblo Risso
	Riviera Show
	Duty Free Shopping! and Riviera Show
Pilar Iglesias	Farmer and Development Officer for MPM
Rob Gibson Enrique Favre Maria de los Angeles Bruni	Beef and Arable farmer Inst Agri, Paysandu
Rosario Lazaro Virginia Guardia	CREA
Gonzalo Gaggero	INC
Dr Vasconcellos. Former Vice Director of Foreign Trade	
Diego Payesse	Australia Consul Agri Economist and agronomist
Gerado Garcis Pintos Gabriel Capurro Occar Eduardo Ilundain	President of SUL. Video Cattle sale
Maria Isabel Pravia Nin Juan Jose Arrospide	Genetic Evaluation INIA Record and grades cattle for Video Sales

New Zealand

Name	Organisation
Dr Mike Tate Sarah Adams	Catapult Genetics
Robbie Burnside	N. Sch 1972
Vaughan Templeton	Western Southland Monitor Farm Meeting N.Sch 2005
Ceri Lewis	Mount Linton
Karen and Daryl Johnson	
Leon & Wendy Black	
Alliance Group	Lornville Abattoir
Scott McDonald	Kelso
Robin Campbell	Director of Innovis and TEFRom Breeder
Anna O'connell	Agresearch – Invermay
Robbie Hughes	Texel Breeder – emigrated from Wales
Jon Hickford	Lincoln University
Andy Fox, N Sch	Foxdown, Amberley
PGG Wrightsons	Paul Pocher Ian Walsh
John and Rosie	
Duncan Fraser	Large scale Sharefarmer
Turangnui Romneys	Michael Warren
M & W NZ	Richard Wakelain
Wairere Romneys	Derek Daniells, N.Sch
Rissington Breedline	Bayden Wilson
Greg and Siwan Shaw	
Bruce Orr – Wrightsons Clayton McElwee, Wrightsons Real Estate	
Gareth a Siwan White	Emigrated from Wales in 2007
Elfed a Martha Williams	Dairy Farmer who emigrated fro Wales

Argentina
Juan Galli, Buenos Aries

Serbia
Miroslav Budinski, Novi Sad

Poland
Simon and Wanda Gill and Family
Brendan O'Gorman
Piotr Blonski

UK and Ireland
Deanna Leven, Innovis
Prys Morgan, Hybu Cig Cymru
All past and present Scholars

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And finally……

Not everything goes to plan, and we will all get stuck on a few occasions. There is always help available, we only need to ask. It may not always be the obvious solution.

Seek the opportunities as they *do* exist. The ones worth having are the most difficult to find.

…. and my final thought as I finish typing, there is no such thing as a free dinner!!

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