



2003 Scholarship

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Topic:

The Study into Lot Feeding Beef and the subsequent techniques to maximise the value of the product through Quality and Safety Assurance Programmes.

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Executive Summary

My Nuffield Scholarship was intended to give me the opportunity to study the lot feeding Industry overseas and also examine ways to improve the consumer's perception and consumption of Beef as a meal by providing minimum standards of safety, quality and consistency.

Currently Australia slaughters around 8.50 million Cattle per annum. We feed about 10% of these cattle to finish. Our Feedlot capacity is around 800,000 cattle. The Industry is quite small in comparison with others worldwide, however we export 90% of production, making Australia the world's largest exporter of Beef. Our main overseas markets are Japan, USA and S. Korea. There is much potential to add value to Beef in this system.

I felt that the product we turn out has some failings and there must be some way to compete with Chicken and Pork on a more even basis. In summary, my Nuffield tour has led me to the following conclusions:-

- Beef Quality is affected more after leaving the farm gate than pre farm gate. This potentially makes the Producer's role in the supply chain minor.
- The major users of Beef in Australia (Supermarkets), are only interested in margin and volume.
- Processors (Feedlots, Abattoirs and Packing Companies) are also driven by cost of production per kg and volume.
- Consumers are not prepared to pay more for quality generally as it cannot be quantified, and in some cases will not buy better quality Beef because of the less attractive look of aged, well-marbled Beef.
- There may be a swing away from well-marbled Beef (and with it more tender, juicy Beef) as consumers are trying to avoid obesity and associated health problems.
- The public assumes that if the Supermarket is putting the Beef on the shelf, the product has met a standard that is acceptable to the average consumer. However another health scare in the Industry will destroy all of this confidence.
- Information does not flow back easily from Consumers to all other parties in the Supply Chain.
- All participants in the Beef Supply Chain need to work in partnership towards a common goal.

These points have led me to wonder what could be done to provide consumers with a high quality product with some kind of regularity? The challenge will be to promote a meal that is largely equivalent to the typical meat the Supermarkets are presently stocking. However it will be healthy, safe, look good to the consumer but also satisfy the customer with quality and consistency – two traits very hard to quantify. Quantifying the quality of Australian Beef is going to be the biggest hurdle in the next few years.

Acknowledgments

I would like to thank my wife Jill for the support she has given me while I have been undertaking my study. Without that help I would never had been able to leave. I would also like to acknowledge the assistance my Employees and Business Associates have given us both, their willingness to become more involved in our Business while I have been away has been the difference.

AWB Landmark needs special mention because of the financial support they have provided to allow me to undertake this programme – I hope that this report goes some small way to repaying their belief in the Nuffield Scholars Association and convinces them of the value of continued support.

The Queensland Department of Primary Industry (Peter Smith) has given me some valuable contacts in the American Lot Feeding Industry.

Dr Russell Cross who started me on my travels in USA.

Dr Mohammad Koohmarie, Dr Larry Cundiff and the other researchers at the Meat Animal Research Centre in Nebraska.

Henry Gardner in Kansas for being so willing to share his opinions with me.

All the Staff at Texas A&M University.

Dr Gina Bellinger from Food Safety Services in San Antonio.

Bryon Bay Cookie Company has given me an insight into Marketing and perceptions of the public.

Louise Manning and her study of Quality Assurance programmes in the UK.

Objectives

The Objectives I had leaving Australia were broadly to improve the value of Beef for the benefit of the Primary Producer. The product that we are responsible for in Australia has a great safety record, is nutritious, can be used in a variety of ways and is a good value source of one of the essential food groups.

We are being left behind by Chicken and Pork – why? How can we reverse this in a practical way from the farm gate to the finished product at the end of the supply chain?

1. I was specifically interested in the Lot Feeding Industry to discover ways that the operators in America were improving their profitability and quality of product as a starting point. I then wanted to use this information to improve Australian Lot Feeder's techniques.
2. I wanted to explore the techniques that Cow / Calf producers around the world, were using to maximise the value of their Beef.
3. How these two parts of the supply chain were forming alliances to then move downstream and generate more profit.

The market signals coming from consumers along the supply chain are generally confused and very often totally dislocated. It was also clear from speaking to many producers that we are our own worst enemy. We are not prepared to work within the "Food Chain" but instead see ourselves as the last bastion of the free, individual pioneer that settled Australia in the 19th Century. What can be done to change this?

I left Australia with the goal to find some of the answers to these questions.

My plan was to first study the production of Beef in the UK, before moving onto USA. I was interested in speaking to all links in the Supply Chain from these two regions. This included the commercial Cow/Calf Producer (if such a thing still exists in the UK), right up to the meat packing plants and their representatives at Industry level.

Introduction

The nature of a Nuffield Scholarship allows a freedom to study in an organic way. The ability to follow developing leads is unique in many ways and left me well equipped to find some of the solutions to the issues affecting the Beef Industry and give us a chance to compete with the Chicken and Pork Industries.

Consumption will only reflect these improvements when our product has more attractive meal solutions to the consumer, i.e. easy to prepare and of a consistent quality that will keep the purchaser buying beef regularly to make a convenient family meal.

The Primary Producers in our Industry need to work out first who the Customer is and then learn what that Customer wants! In some cases our Customer is the Feed Yard Operator down the road, in others it is the Processing Plant – but eventually we assume that someone is going to be eating our product as a meal solution.

This is where we hit the first hurdle. If our Customer is primarily a Processor but eventually an individual, how do we know which party's needs we should be addressing? The reality is that a product that is attractive to a Packing Plant is often not what our individual is looking for in a meal.

We have all heard the saying “if we can measure it, we can manage it”. We are now measuring Cattle performance with -

- Calving Weight
- Growth Rates (200, 400 & 600 day weights).
- Eye Muscle Area
- Days to Maturity
- Feed Conversion Ratio (FCR)
- Carcase Yield to Liveweight
- Percentage of Beef to Bone and Fat
- IMF % (Intra Muscular Fat %)

Finally we put a subjective measurement (through visual inspection of the exposed meat cut), on quality with our Beef Grading System. We determine how much marble fat it possesses, what the Meat and Fat colour is like, then we grade it according to our results. How can the consumer have confidence in this method of quality measurement?

Can we change the way beef is assessed to improve this confidence? How will creating alliances between producers and processors improve the product we are providing for the public? Is it possible to benefit both Processors and consumers? Where can we improve the consistency of the finished product? How can all this impact positively on producer's profitability?

Global Focus Tour

My studies began with ten others in New Zealand as part of the Core study program. We spent the next six weeks looking at Agriculture as a part of each country we visited. This gave us an insight into how Government influences or can be influenced by the agricultural sector and provided an outstanding grounding for further travel.

We were given an insight into the issues that are high on Governments agendas and explored, among other issues;-

- ◆ The changing subsidy system in the USA and EU.
- ◆ Agri-politics and it's role in Industry.
- ◆ Agricultural Research and Development.
- ◆ Environmental Conservation and Rehabilitation.
- ◆ Environmental Audits and Health concerns such as Nitrate leaching.
- ◆ Great Lake poisoning with E Coli O157:H7.
- ◆ BSE and the fallout from Foot and Mouth.
- ◆ Australia's Photo sanitary and sanitary regulations and the reasons behind it.
- ◆ America's attitude to trade i.e. Exports!
- ◆ Water Rights issues in New Zealand, Canada and USA.
- ◆ Environmental sustainability in rapidly growing urban populations through most of the northern hemisphere.

At the end of this six week tour I embarked upon the specific study pertinent to my topic.

Industry Overview – United Kingdom

The UK Beef Industry has many problems. It is still suffering a 70% clean out after Foot & Mouth Disease (FMD). Cattle over the age of 30 months are almost worthless due to the mandatory “Not for Human Consumption” regulations because of Bovine Spongiform Encephalopathy (BSE). This regulation may be going to be lifted in the next two years. Beef is rarely eaten as a primary ingredient by consumers (i.e. Steak) and when it is, it’s usually of a quality well below expectations or so expensive that it is not for regular consumption.

The EU have a system of subsidies that are paying Breeders and backgrounders for production. This system is being overhauled at the end of 2004. Crop and Livestock subsidies are being removed and replaced with a Single Farm Payment (SMP), that owners of the land will receive whether they produce Beef or not. Many producers see this as an opportunity to remove all livestock from their farming system. Current cost of production is above that of the price they are receiving at sale so their only profit is the subsidy.

There is very little feedlot production in the UK. Most of the Beef eaten is a by-product of the Dairy Industry (51%) and is usually Friesian Bull Beef, which is not bred for quality of beef but rather production of milk. JSR Farming are an interesting exception. They have a 1,500 head AI program in place and are trying to raise their breeding herd to 15,000 head of British X European Cows with high quality “Stabilizer” semen (MARC II), being imported from New Zealand and USA for Beef production.

There is also some higher quality production systems aimed at schemes like “Waitrose” and “Harrods” (i.e. Fillets of Beef in Harrods retailed at 50 pounds). The big supermarket chains are offering better Beef for a higher price and branding them with recognisable names like Jamie Oliver. The Beef is mainly grass fed during Summer and Barn fed in the Winter. This is successful to a point but generally Beef is not a very popular food in the UK.

The Environmental Farm planning has become a huge cost of compliance to farmers. Initially it was a practical guide to sustainable crop and livestock production, but it has become a monster that is overregulated. The biggest concern is it is no longer a point of difference but instead a minimum standard that you must achieve to sell produce to major retailers.

The Industry has shrunk to such an extent that roadside Markets are seen as a viable way of making a living and the variability in supply and quality is becoming larger not smaller. The Industry is crying out for some high quality, even production but most producers are too

concerned with the changing subsidy system to move in this direction before the markets have settled down post SFP.

There is a niche market in the UK and EU which focuses on healthy Beef which has been raised with respect to the environment. As an example of this are the following Beef prices :-

UK Carcase weight prices

Scottish Aberdeen Angus Organic	£2.65 / kg = \$6.46 AUD/ kg DWT
UK Organic	£2.60 / kg = \$6.24 AUD / kg. DWT
Aberdeen Angus	£2.15 /kg = \$5.16 AUD / kg DWT
Scotch	£1.90 / kg = \$4.56 AUD / kg DWT
English	£1.75 / kg = \$4.20 AUD / kg DWT
Irish	£1.60 / kg = \$3.84 AUD / kg DWT

As can be seen by the difference in pricing, the Organic Beef movement is securing a considerable premium. This premium is more pronounced in the UK and Europe than in any other country to my knowledge but still only represents a niche market that may be in danger of saturation.

Industry Overview - USA

The Beef Industry in America is very mature. It produces around 30 million grain finished cattle each year, of which only 13% are exported. There is good profitability in the Industry. This has been a turnaround from just eighteen months ago. Processors are embracing new ways to cut meat that is designed to maximise dollars from the carcass. Killing and processing chains are redesigning themselves to address the food safety issues from BSE. They are all expecting their second and third cases very soon.

There is much consumer satisfaction with Beef as a product. The quality grades work well and as a rule if a cut of Beef is graded Prime then 94.4% of consumers who eat that product will be highly satisfied with the quality. Choice - 89.2%, Select - 73.6% and standard - 40.9%. This would be seen as a tick of approval for the grading system.

Some of the Retailer problems with Beef have not been solved however. In the last three National Beef Quality Audits (NBQA), completed in 1991, 1995 & 2000 there were the following recurring concerns. Low uniformity, too much external fat, Cuts too heavy, low cut-ability, low palatability and inadequate tenderness. The fact that these challenges have not been met, I believe, says a great deal about mixed messages producers are hearing from the supply chain. The lack of uniformity can be blamed on these mixed messages.

As I see it there are major health issues with the American Beef. 62% of the adult population in the USA is obese or overweight (National Health Audit 2003). Fat is now being trimmed from carcasses to less than 6mm, as a result of one of the NBQA's recommendations. The amount of intramuscular fat is high but so far the Industry has been able to convince the public that it is healthy fat!

Having said that, the eating quality of the Beef is second to none. They are trying to improve the health aspects of their product. There is a scheme in place to reduce the amount of Hormonal Growth Promotant (HGP) being used in the last 100 days of an animal's life. Many research dollars are being ploughed into marbling and how to maximise the amount of intramuscular fat while not increasing the level of seam fat.

Currently there are five companies that do the majority of processing work. They are, in order –

1. Tyson – formerly IBP
2. Excel – or Cargill
3. Swift – or ConAgra
4. National Beef – owned by US Premium Beef company
5. Smithfield Beef – who processes mainly Holstein Beef from the Dairy Industry.

Generally these Holstein calves are much cheaper to buy but they have an average grading of 50% Prime and 20% choice as against the recognized Beef breeds that usually grade 5% Prime and 50% choice! They are usually fed for 300 days and not implanted with HGP. Most other Beef is fed 150 – 170 days.

Food Safety is the biggest issue on the radar at the moment. E Coli, Salmonella and Listeria are all being tested for in all tubs of trim from Carcasses in all processing plants. It has been seen as a non-competitive issue between all sectors of the Beef Industry.

BSE has been an issue but the Government and Industry working together have been able to convince the domestic public that the health concerns have been addressed. If and when another case is found general consensus is the public will not be so forgiving. Most fast food chains will no longer use Beef over 30 months of age and the oversupply of mature Beef will be potentially crippling. The Japanese are under tremendous pressure to reopen their borders to USA Beef but are managing to resist and are asking for 100% testing to ensure the product is safe. This does not necessarily follow good science which is the point the USDA is trying to make.

At present there is one private exporter (Creekstone), who is asking the government to be allowed to test all their Beef to enable them to export to Japan. The US government has blocked them from doing this. Canada seem prepared to move to 100% testing to gain access to this market. This means the USA Beef Industry will probably have to follow suit if they wish to export to the same markets. If the USDA tests exports they will also have to test all domestic Beef as matter of course and the cost will be tremendous (because the export market can not be seen to be safer than the domestic regulations insist upon).

Once again the growth in the Industry seems to be in the naturally raised or “semi market. The price premiums are considerable (20 – 30%) and while it is not strictly organic has much interest from consumers. One Example of this is “Maverick Ranch All Natural ex Moore has developed two different Beef lines. First is a product that is tested all clean for antibiotic, chemical and HGP residue. The second is a production free product (the producer has guaranteed to not have used any chemical, antibiotic a or HGP in the cattle. His main market is the ground beef supply and is getting the 20 - 30% premium.

Methods of Product evaluation

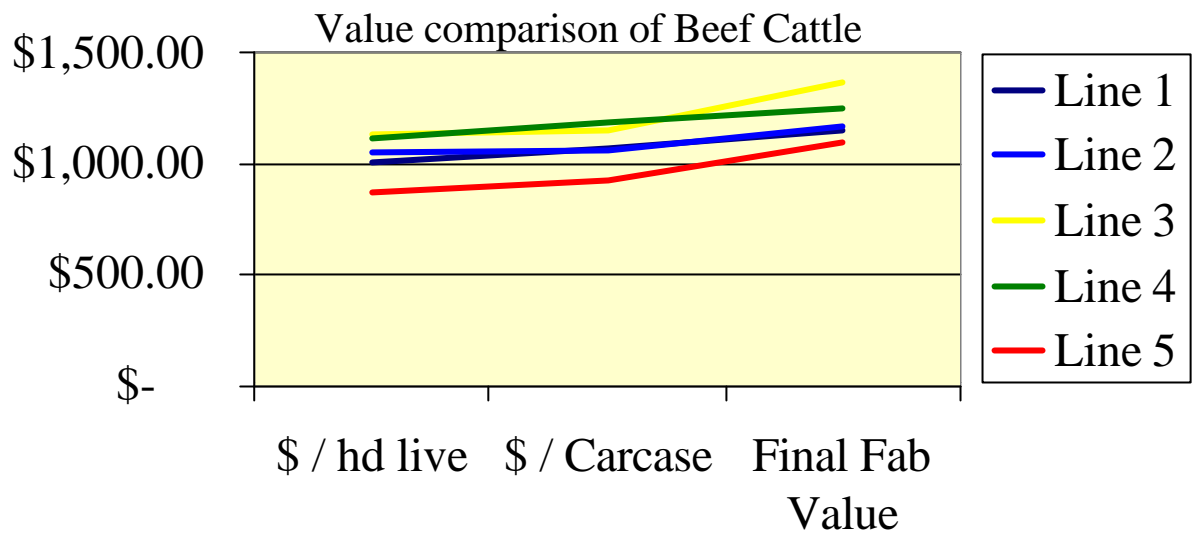
I was lucky enough to be able to sit in on a “Texas Beef Council” training programme called the Beef 706 Seminar. Central to this seminar was the theory that producers needed to be paid on “value based pricing”.

It may not result in an average price per head better than what that producer was going to get under an average pricing system, but it would provide the incentive for change by allowing Producers to see what type of Cattle were giving the most value. Dr Temple Grandin says on her web site – “When Losses can be passed onto the next market segment there is no financial incentive to reduce losses”. “Systems of financial incentive must have accurate measurement of losses”.

We were required to grade visually a number of cattle (all similar weight), on the hoof and then follow them through the processing chain to see how the “actual” value changed. As you would imagine most of us picked (what looked to be) the high quality Steer with good cover and black hide to be the most valuable. A professional grader who then put a value on all the Cattle according to USDA grades, confirmed this conclusion.

We then went to the next step where the cattle were “Harvested” and electrically stimulated, washed in an acid bath to reduce the pathogen load and assessed on carcass traits to estimate their value reasonably accurately. The lead changed here between the previously first placed beast to one that was “underdone” in the eyes of the group. The Carcass in question was good yield (2.7), and “choice” Quality. We then quantified the value of those carcasses using the beef cattle prices averaged over the last six months.

Our final step was to bone out those carcasses to calculate the value of beef yield to waste or “Drop”. The carcass that came first by a country mile was of course the European Cross with enormous Rib Eye area, little fat and a quality grade “Low Select”. The added value that could not be measured on this particular steer was the value to the Cow calf operator because of high growth rates which meant earlier turnoff or higher weight at turnoff. Nor were we able to measure the value to the Feed Yard who were able to bring that beast to turnoff weight faster for less feed and therefore more profit for them potentially.



As can be seen by the above graph, the best performing steers at the three points we measured them were not always in the same order. Also there is great opportunity to improve the value of certain carcasses over some of their competitors. It was interesting to note the value gained for beast number 3 and 5 out performed the other three steers.

One last exercise was carried out on those Steers. We had a taste test. As you can all imagine the most valuable carcase was the one most likely to discourage consumers from eating Beef again for some time!

While I was not able to carry out the same practical test in the UK, the grading system is similar to the Australian one. There is a range of carcase yield grades (E,U,R,O,P), and then a different range of fat cover grades 1,2,3,4,5. There is no emphasis on Quality at all, yield is the only measured point of performance.

After speaking with retailers in the UK, I am sure that the same market signals are being confused. We have a case of the highest value carcase being the Friesian Bull Beef which is quick to turn into maximum Beef for least cost. It is not high quality Beef produced with the Consumer in mind.

Food Safety and Pathogen/Disease Testing

While I was travelling in the USA the issues regarding levels of pathogens in Red meat kept coming up. During 1993 a chain of Hamburger shops called “Jack in the Box” had an outbreak of E Coli O157 : H7. Many diners were sick and there were four deaths. The Restaurant shifted all blame onto the Packing house which blamed the Processing plant for supplying them with infected meat.

The net result of this has been an extraordinary amount of intervention in the supply chain from entry to the slaughter house to packing and cooking in fast food retail chains as a result of Government legislation. The main control is on the slaughter house floor where schemes such as chemical de-hairing, acid bathing, hot and cold washing, pasteurisation & steam vacuuming have been tried - and the list goes on. The latest research is trying to persuade the Federal Government to allow surface irradiation of whole carcasses without the subsequent product carrying the radiation symbol.

The Processing houses are also carrying out mandatory testing on all trim taken from the carcasses. This work is being done by outside contractors to avoid the collusion issues. An interesting fact of testing this trim is the science involved. With the present legislation, the politicians are seen as having done something to protect the public but there is little chance that the testing will pick up all pathogens within the trim bins. 5 core samples of 20,000 lb Combo – bins are taken then, a sample (about 0.25 lbs), is made up from these. Most of the Scientists involved are working to reduce the amount or incidence of pathogens getting to the consumer, however they all understand that it is a case of minimising risk as best they can rather than eradication.

The Industry is now trying to find a solution to the BSE issues which has caused their export markets to be closed to all but Mexico and Canada. The Japanese are still insisting on 100% testing of Beef coming from any country that has had a incidence of BSE. The scientists involved in the government talks have all stated that BSE is not detectable in cattle under 30 months of age, so the testing of all cattle would not be of any use – this has not swayed the Japanese Government as yet.

While the US Government is trying to re-open the market, there is every chance that another case of BSE will be found in the next twelve months. The US are undertaking to test 275,000 cattle this year – up from 20,000 last year. When the next case is found any market access they have managed to secure will be closed again. On top of this is the added problem of lack of supply. The lowered demand has kept pace with the Industry wide reduction of cattle numbers. Drought and present high prices have caused a clean out leaving very few cattle for regular sale. Prices are at historically high levels which is even more remarkable considering the closed export markets. Processors are now in a position where the current high prices are putting pressure on their profitability. They have not been able to pass all the cost onto the consumer. The Industry is divided on which direction the market may take, especially if exports are reopened.

The UK Industry is in better shape in regard to the Pathogen testing. They have not had the same health concerns in regard to Pathogens. However BSE has caused much distress and has been linked to Creutzfeldt Jakob Disease (CJD, a degenerative Brain disease), which has caused many human deaths in the UK.

The current Government policy is to not allow any Cattle over the age of 30 months into the food chain. This policy has resulted in a reduction of deaths related to CJD. Recent thinking is that BSE is able to be eradicated totally from the Industry with careful intervention.

Branding and Alliances

We now have – right around the world – a system of quantifying Beef value that is not giving the consumer any input into the process! The exception is of course Branding and product recognition where the consumer tells us with their money what they prefer. The opportunity to increase value by using an identifiable brand is considerable.

However to move in this direction on their own, a Producer needs a great deal of time and money. As an example most of the readily identifiable brands in our lives right now (Coke, McDonalds, Kentucky Fried Chicken, etc.), were developed 40 to 50 years ago. To put this kind of investment into a project often forces parties into co-operatives or companies with other like-minded individuals and this is also, unfortunately, where most of them tend to fail. Traditionally these partnerships have a limited lifespan due to different expectations and objectives of the business partners.

To give an example of this, I met a gentleman who has been in the Cow / Calf business in Texas all his life. I would consider him to be innovative in business and profit driven. He embarked upon a Composite breeding program to increase the value of his Calves. While he was working to this end he met a Feed Yard operator who was also breeding Composite Stock in his own Cow / Calf unit.

This Feed Yard had developed a cross they were very happy with and as a result were prepared to offer Cow / Calf operators free Bulls to put over whatever breed of Cow they had. The proviso was that he was allowed to buy all the progeny but only at a premium to the market on the day. The program shut down because this Feed yard could not get enough producers interested – they were not happy with the look of the progeny! This also makes a mockery of Temple Grandin's statements about measuring and getting value for your product.

Traditionally we have been a very segregated Industry. We tend to be untrusting of the Feed Yards, Abattoirs, Packing-houses and Retailers. This has developed an Industry which is known globally as being the most dishonest and cut-throat to be involved in. Industry then makes life even harder by butting heads with Government about regulations, about OH&S and Food safety. It is no wonder that we have little movement of information within this environment.

We need to remember that all of us in the production chain cannot defer responsibility of food safety or Quality to others in the supply chain. It needs to be an Industry wide commitment. For this reason the natural development of the supply chain leads to closer relationships between parties with vested interests.

Conclusion

As more families have two working parents, convenience foods have become more popular. Beef has not been microwave friendly in general. Either this needs to change or Beef producers need to celebrate and promote the fact that Beef has other attributes. Chicken and Pork are both still evolving as a simple choice for the family or individual's meal, but Beef seems to have stalled. The competition is being sold on a per unit basis rather than its value being based on weight or volume. This is one marker of the continuing development of Chicken and Pork.

Unless the Producer is going to be paid for taking the time and care, programs like VAC – 45 (*United States Quality Assurance program*) are not going to be taken up. A similar scheme in Australia would be Cattle Care. Pre – Conditioned Store Sales, Co-mingling cattle, Bunk Training and Vaccination programs are of little value at this stage to producers. Weaning at least 45 days before sale and sorting on weight and condition across vendors (Homogeneous) to produce big even lines for Buyers, on the other hand are offering real benefits to the Cow/Calf operators. Their weaners are looking better visually in the market and therefore are more valuable in a system that rewards for perceived visual value.

Objective measurement of carcass traits are here to stay. At present there are computer systems that can very accurately measure some of the attributes in Beef in a time-saving manner. We need to convince processors that these are valuable tools and continue to develop more accurate tests for Industry use. In Australia much of this technology is being used – we need to go the next step. Producers and Feed Yards need to explore the ways we can also use technology to improve the evenness of lines of cattle suitable for slaughter.

The money spent on researching marbling and movement of lipids within the muscle fibres gives some measure of importance this feature is given by the Industry in the USA at least. The processors see marbling as an insurance policy against poor cooking practices. However, research has proved there is no correlation between marbling and tenderness! (Koochmarai 1991). The general feeling is that marbling will give more flavour and juiciness and there is some evidence that suggests the cattle genetically predisposed towards marbling are also more tender.

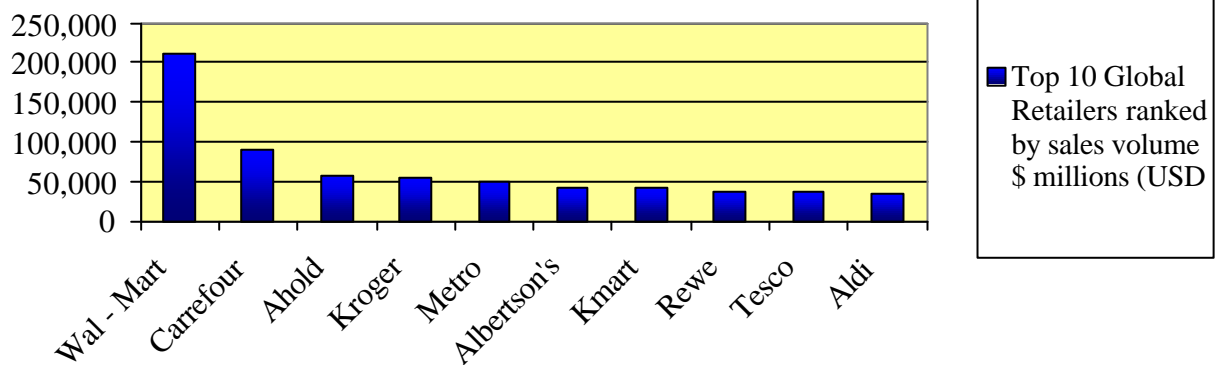
How much this is going to make an impact in future years is anyone's guess. My personal belief is consumers in Australia are going to demand less visible fat in their meat. This puts

pressure on an education program of the public in cooking practices which will bring out the best in the meat.

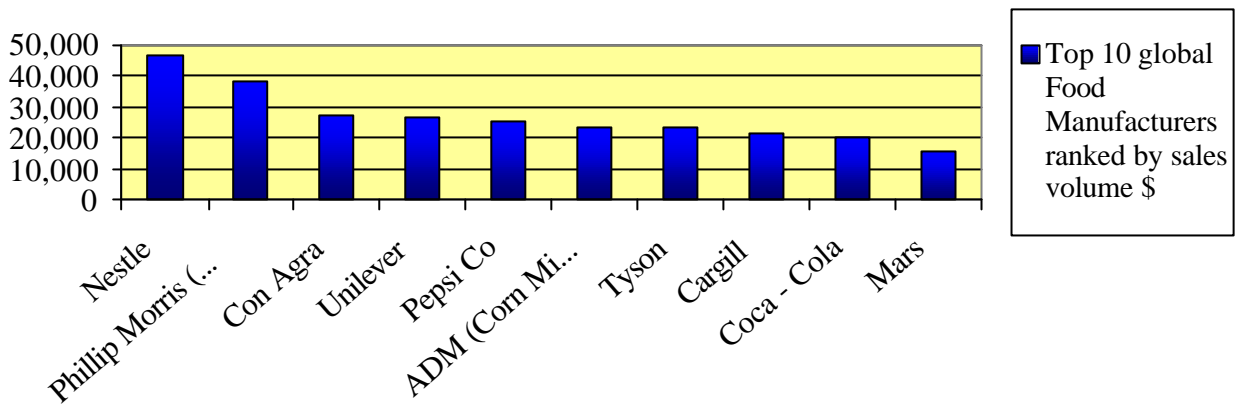
The strategies that have been outlined by the American NBQA are unrealistic. They are suggesting that producers should be targeting the cattle genetics that are fitting customer expectations (marbling, red meat yield, weight, etc). They want producers to tighten up on uniformity but it is impossible until signals that are clear come back from the consumer. The same principals apply for the Australian producer. There is no value to feed-lotters or Producers in chasing mixed signals from the supply chain.

There is an opportunity to perhaps add value to our product by targeting Processors who have a brand of Beef already that they wish to further develop but are limited by how much sufficient quality Beef they can source. In this way producers with proven, high quality genetics can form alliances in the supply chain and be in a better position to hear the market signals that have not been influenced by more dominant parties in this chain. It is interesting to note that Gardner Angus Ranch offer part of their capacity at National Beef to Bull purchasers.

This type of relationship may also be a way to compete with the big retailers. To give some idea of the power of some of the retailers in the food industry see the following graphs.



As a comparison is the following graph showing the sales volumes of the top Global Food Manufacturers.



The influence that a retailer like Wal – Mart can have on an industry is enormous. They have enough power to totally re-configure a supply chain. At present the Supermarkets are using the Beef on their shelves to bring the customer in the shop. What will happen if they decide to streamline the Beef Industry to make more profit from this product line? Beef generally takes a great deal of energy to chill, it will expire quickly if left on the shelf, there is little margin in the popular lines and is not easy to handle (experienced packers are needed or high cost mechanised lines). While there is little margin in this product, the Retailers have identified what they need through the National Beef Quality Audit. The supply chain needs to be aware of these facts.

The Organic movement may have potential for more growth for Australian Producers. We are raising our Beef mainly under conditions that are healthy and satisfy Animal Welfare sensibilities. Is there an opportunity to usurp the Organic market to become: -

- A). More mainstream and
- B). Less difficult to achieve a standard that satisfies the consumer?

The continuing growth in the health industry is becoming a major market for Organic products across the world. The lower population in Australia however, mean Australian Producers may have to look to overseas markets to gain enough critical mass to make the step a valuable and viable one.

What does the present fad for low Carbohydrate diets mean to us as producers? There is every reason to believe that if the current craze for Low Carbohydrate foods does not continue there will be at least a continued swing to balanced diets in our daily living. This is good news for countries like Australia. We have healthy Beef, we are able to provide a product that will satisfy the trends in food industry. We need to build on this reputation.

Recommendations

So to get back to the Industry in Australia and the options for Producers and Feed Yards to increase their profitability. Below are a list of potential areas of growth for our Industry. In the main they are simple and common sense alternatives to build some more value into our Industry for the benefit of Producer and Feed yard primarily but also the other links in the food chain.

Alliance Building –

By forming alliances between growers who have cattle similar enough to be grouped together in homogenous lots to give more value to the Feed yards, these producers will be able to ask for a share in the extra value. Breeders should enter into breeding alliances with Seed-stock producers to provide a more even group again (based on genetic content), to be collected for sale to Feed Yards.

An important point to remember when setting up alliances is this – currently there are 44 different Beef QA programs running in the USA, and about 80% of all Beef coming through the chain are branded in some way, shape or form. However most of these same brands have little or no value to the producer or the consumer. Currently the extra profit from the carcasses that grade into one of these brands, is being distributed within the manufacturing links of the chain. If an alliance is going to be entered into it must have some value to all parties in the alliance!

There is also an opportunity to form an animal health alliance with Feed yards. If this is viable then individual animal treatment can also be matched across different vendors to minimise the risk of doubling up on veterinary treatments. This has two benefits. One, the costs per head is reduced, two, the public can be sure that sound veterinary practices are being followed.

For example, consider a Breeder that treats his stock for Lice before sale to a Backgrounding operation which treats all stock for Lice as a matter of course. He then sells these stock on to a Feed Yard which treat everything for Lice. The net result is wasted money in the process as well as potential Withholding periods for slaughter stock being breached. This could have all been avoided with some interaction amongst the supply chain.

The basis of successful alliances is information flow. The information must be moving freely but must also be in a useable format. If producers are selling their cattle to a feedlot with intentions of getting some measurement of how these cattle performed, it has to be in a useable format.

Alliances do not have to be within the traditional supply chain. One example of a successful step outside the box is “OBE Beef” (*western Queensland group of organic beef producers*). Their point of difference is what was previously considered their main disadvantage I.e. distance and a harsh environment. Now they boast having over 7 million acres of Organic rangeland under the alliance and sell their product directly overseas to a solid Japanese market.

These healthy products are not consistent. The variability of the cattle in this system has been turned to their advantage – retailers welcome the variation and use it to reinforce how healthy the product is. A point to remember in this particular successful alliance is they hired a Manager to handle the marketing and a great deal of the feedback to breeders.

Value Based Marketing –

Producers must start getting paid for the value of their cattle. It is the best market signal we can have (and pass on) to improve the value of our cattle. Averaging allows many cattle that should never have been bred to slip into the chain. They invariably get sold and the producer and Feed yard pat themselves on the back for being able to turn them off. The reality is these cattle have cost every step in the chain.

Our profitable cattle are subsidising these “outs”. As the above graph points out (value Comparison of Beef Cattle), we need to determine what the consumer judges to be the most profitable cattle and breed them!

Feed Yard Re-configuring –

Feed Yards have an opportunity to perhaps reduce the time on feed for cattle. By reducing the feed put into an animal and bring that beast to a less finished state, there are health benefits (perceived) for the consumer who has not had their food subjected to as much intensive agriculture. There are financial benefits as well from this reduced feeding regime. Animal health is a definite selling point. Intensive agriculture will always have a poor name in the public arena. There is an opportunity to change perceptions about the whole Industry.

Genetic Improvement and DNA Marking –

The development of DNA marking to flag cattle that have a predisposition to marbling and tenderness has been one of the technological breakthroughs to potentially change the way we select cattle genetics. While the test is not the only way to determine higher quality cattle it is one method we can use. As time goes by and the repeatability of the genetics are proven, Feed Yards and processors are going to be looking for these genetics as well. They are likely to increase profitability in all steps of the supply chain.

An interesting finding from my tour has been the correlation between Angus and Shorthorn cattle for having enzymes that are highly receptive to proper aging. This means that those two particular breeds have genetics that will pre-dispose them to age extremely well with proper hanging. In other words if a Processor buys Angus or Shorthorn cattle and hangs them well they will outperform other breeds with tenderness. With a small amount of marketing, this product may be sold at a premium to give more value to all links in the chain.

Low Stress Stock Handling and Selecting for Temperament –

Buying cattle that have a highly-strung temperament or have been poorly handled to bring out their worst, are costing all Beef sectors money. They are harder for the breeder to manage as calves and weaners. They take longer to settle down in the Feed Yard, thus eating less and taking more time to reach the targets (time is money). They tend to excite all the cattle in the mob thus causing a percentage of dark cutters.

Their excitement causes them to quite often rush about and cause bruising to themselves and other individuals in the pen or yard. Producers need to hear the market signals. These cattle are losing popularity in the market because of their lack of potential.

A technique that has been proven to be of value is the application of Electrolyte supplement prior to transport to Abattoirs to minimise the carcass weight loss and incidence of dark cutting (Schaefer et al 1997). This Electrolyte supplement will work on calm cattle as well as the more excitable types.

Feed Conversion Ratios –

Feed Conversion Ratio (FCR), studies are currently being done in Australia and USA. Researchers are trying to determine if any particular breed or strain are better at turning feed into Beef. If some correlation can be found then producers can offer cattle to Feed yards that have faster turnoff rates or conversely feed for less cost.

The potential downside may be to increase the toughness of the meat. There have been studies that correlate FCR efficiency and higher Calpistatins in the meat. (Koohmaraie 2003). This means that the Calpain enzyme that breaks down connective tissue during aging is stopped early by the Calpistatin movement in the meat. Despite this, study will potentially have huge influence on profits.

Marbling Genetics –

Current studies in the US Beef Industry have established that a minimum of 11 mm fat at the 12th rib will give most cattle enough cover to marble sufficiently to satisfy the consumer. The Industry standard asks for around 5mm of cover fat to be present on the Beef cuts. The vigorous trimming of carcasses is common and now processors are starting to develop ways to trim some of the fat while the carcass is hot (thus taking less work and time).

If we are trying to copy the American product, more work needs to be done to establish why American Beef seems to be differently marbled to Australian Beef. For some reason the Fat within the US Beef is higher in “greasy” fat which may give a more juicy feel when eaten. Cattle diets need to be studied and the way different feed components react with each other within that diet. Perhaps the fact that most American cattle are fed for longer periods at slower growth rates is affecting this as well. We also need to find some definitive reasons why we should be selecting cattle for marbling – i.e. what is the benefit?

With the exception of Bos Indicus cattle, there is little influence breeds have on tenderness. Some breeds have a predisposition but in general there is more variation within breeds than between breeds (Koohmaraie 2001).

Objective Measurement –

Quantify all claims. If we say these cattle have tender meat we must be able to prove it. If the carcasses have high intramuscular fat, how can we confirm it? The present system of MSA grading in Australia is going in the right direction.

Presently carcasses need to fulfil a number of specifications to make MSA grade then they are assessed within that to tighten the segregation. The minimum standards are :

- ◆ Rib Fat greater than 3mm
- ◆ Ossification less than 300
- ◆ Even Fat distribution over hindquarters
- ◆ Meat Ph to be lower than 5.71
- ◆ Meat colour as assessed by the MSA Cards
- ◆ No obvious bruising

Then the segregations within MSA depend upon the following:

- ◆ Marbling at the M Longissimus dorsi. Range is between 100 (Lowest), to 1100 in increments of 100.
- ◆ Hump height
- ◆ Meat colour
- ◆ Fat Colour
- ◆ Ultimate ph between 5.3 and 5.7
- ◆ Rib Fat

We need to continually find more valuable tests we can perform to segregate our meat into tighter specifications. As Wheeler said in his study in 1994 “it reinforces the need for a direct measure of tenderness to supplement marbling to more accurately segregate carcasses for meat palatability”.

At present there is only one test that will assess tenderness. That is the Warner – Bratzler shear force test. It is an invasive test (a sample is taken from the longissimus dorsi and cooked, then a core is put through the shear force machine to measure pressure taken to cut the meat). A critical cost of this is the time taken to quantify each carcass. A system has been developed to handle up to 500 head per day (approx) but this would simply be too slow for Plants killing up to 10,000 per day.

Video Scanning –

New advances in this technology have allowed at least one Feed Yard in USA to demand a premium from the processor. They are using video imaging to assess frame score, ultrasound to assess fat cover and production data collection to allow a computer program to first draft cattle into homogenous mobs then predict when is the most profitable time to slaughter these cattle and track their performance right from Calf to Carcase. They have their variation in kill groups down to less than 10% of the Industry average in most cases.

The system has allowed the Feed yard to maximise the profit from each beast not just the most profit per pen bought or pen sold. They still sell their cattle to different markets or brands, depending on their weight, yield and quality grade, but all the carcasses in that mob are equal. It has also allowed them to feed the cattle for the correct market.

Studies have shown that if a mob of similar bred cattle are fed together the “bell curve” of their variation usually gets longer. The really good cattle get going quicker for faster results while the worse cattle cost more and more in profit the longer they are kept. This is the case even if they enter the feed yard in a very tight group!

Know your Market –

Export market or domestic? Supermarket or Restaurant? Grinding Beef or higher quality cutting? If your cattle are suited for one market don't try to prepare them for an alternate sale end. One more point that needs to be made here – don't set your breeding objectives to maximise the revenue from Cull and Cast for Age Cows! Many people seem to be selecting Bulls for the frame it will give their Cows rather than their annual production. Any Genetics that are not realised before 20 months of age are worthless. This is the production period our cattle have to fit into.

Organic Beef Production –

The point of difference in an organic system is safety and implied health benefits. Variability of the product is seen as normal and natural and even that is being tightened up to improve market acceptance. There is no better Pathogen control and the market is still niche. Year round supply is the limiting factor in organic system and the Industry lends itself to alliance development.

Any perceived health claims to the Beef in comparison have not been quantified yet and the Organic producers are careful not to compare themselves to the mainstream on food safety. Bringing up issues about health and safety will only turn all consumers away from Beef in general.

The regulations on Organic standards across the world are not standardized. Some of these standards don't allow *commercial* organic farming, but rather are unrealistic expectations which make it harder to farm organically for no real economic benefit. There is an expectation that these Standards will only get tougher in time.

Animal Welfare –

Animal well-being is already seen as a selling point. In the future animal welfare audits will become part of the cost of compliance in Australia as they already are in the UK. Our Industry needs to be ready for this and perhaps pre-empt the legislation. Feed Yards can set themselves up to be seen as proactive with their QA manuals reflecting their attitude towards Animal health and welfare.

Environmental Health-

It goes without saying that this is a big vote catcher in Australian Politics. For this reason we, as Farmers and Land Custodians, will be in the Spotlight for any environmental impact we may have or perceive to have. By being able to produce a document that says what our aims and goals are now rather than waiting for legislation we will be in a much stronger position to avoid the regulations.

Food Safety –

Food Safety will also be under the same spotlight, especially with the Bio-terrorism threat. We need to be ready. Access to Feed Yards by unauthorised personnel needs to be minimised and sign in / out sheets are good ways of documenting who has access to yards. The value to a particular Feed yard is negligible but it will be of Industry wide benefit in the long run.

The use of HGP is being reduced in the US because it affects the meat quality. The EU doesn't allow any HGP use in imports to the EU. If this can be tied to animal welfare and Beef quality in other parts of the world, it will become commonplace. At the moment the value of HGPs are too great to be ignored. On the health aspect of HGP, a cup of coffee will

contain about 500,000 nano grams per gram of HGP. A slice of beef that has been treated with two doses of HGP will contain about 0.60 nano grams per gram. (Dr K Smith et al 2002).

Standard Operating Procedures –

Breeders, Backgrounders and Feed Yards need to have a standardised set of operating procedures that are of benefit to the person using them but then also have a real benefit to the next step in the supply chain. For instance, if the Breeder runs a vaccination programme that reduces their losses from say Pulpy Kidney, the breeder needs to pass on the benefits to the Feed Yard.

To do this the two parties need to work together on a plan that suits both operations and rewards both parties either with lower costs or more profit. Another example is co-mingling unfamiliar groups of cattle before sale to improve the disease resistance of the cattle. If this is to be done, we need to talk with our feed yards first rather than tell them about it at sale time.

Operating Manuals can also be used to focus the Operators on the simple but important things. For instance narrow calving windows, Heifer replacement techniques, supplementary feeding and nutrition requirement curves, expectations on Cow performance, etc.

Another advantage of Standard Operating Procedures is Employee training. There are many cases where the Permanent Employees are not hired for their Stock handling skills but rather their ability to operate a Spray Rig or such. A well-written Operations Manual will help them to understand what are the critical control points in stock handling.

Use Proven Technology –

Meat aging and Electrical stimulation are other factors that we are not using to their full benefit. Research shows that the continued breakdown of connective tissue lasts for 14 days unless the temperature is too high or too low. This temperature will determine the way calpains and capistans (enzymes) work within the meat structure. Aging is the most effective way of making beef more tender and has been around for the longest time, yet we often do not use it to its potential.

Tender-stretching has been shown to improve tenderness by up to 40% over traditional Achilles Tendon hanging (DC Hopkins, PJ Littlefield, JM Thompson et al. 2000). It is assumed that packing houses will not use these techniques because of the greater cost. TS

hanging will take up more rail space and hanging for 14 days will slow down the throughput while adding cost in storage.

Breeding & Cross-Breeding –

To quote Dr Larry Cundiff :

“ The Beef Industry is challenged to:

- 1) Reduce costs of production to remain competitive in global markets
- 2) Match genetic potential with climate and feed resources available in diverse environments,
- 3) Reduce Fat and increase leanness of products to gain greater acceptance of consumers,
- 4) Improve palatability, tenderness and consistency of Beef products.”

The benefit of Cross-breeding is well documented. Using F2 females in a breeding system based upon Bos Taurus breeds will give a 21% increase to production. The same system developed from Bos Indicus breeds (say 50% Bos Taurus and 50% Bos Indicus), will improve performance about 50%.

The Cow will have better reproduction than any of the purebred lines that go into her genetic makeup. She will be more hardy, have more milk, last longer and wean more Beef per Cow. There are some costs to running this system but the benefits outweigh them.

Briefly there are four main types of Cross breeding systems:-

Rotational – Where Males from A herd are mated to females of B herd and vice versa. A third breed can be added to the mix to improve the system.

Static Terminal Sire – After designing the F1 cow a terminal bull is introduced and all progeny are sold. Can be not as profitable in Cattle because the F1 herd needs replacing with regular crosses of the two parent breeds so there are more intensive management requirements.

Composite – Breeds are designed where there may be four or more crosses that have then been stabilised to be run like a purebred herd.

Composite with a terminal sire – Provides the most opportunity for gain but also has the most “up front” cost because all replacements need to be bought. Management is simpler however and depending on whether there is a Seed-stock breeder willing to produce replacements it has the biggest area of growth.

The most critical thing to remember in cross breeding is the outcrossing needs to be kept up. As one Bull's genetics are being used another (at least), four bulls of the same breed also need to be used in the herd to maintain wide base of genetics. The less breeds that are being used the more out-crossed bulls are needed. So if a two breed rotational system is being used then 14 different out crosses of the same breed need to be used to maximise the heterosis.

A complementary system where the breeder uses two breeds that are similar to produce their first cross Cows has been found to be the most profitable. For example the Shorthorn x Angus mix to then put to a Charolais Bull will maximise the heterosis while still giving the producer a functional Cow that is efficient and not much bigger than the original Angus or Shorthorn purebred beast. This has the least management challenges as well.

“The key to success is not to do one thing 100 percent better but rather do 100 things one percent better”. Michael Jordan

Observations of my Travel

Obesity and food related health problems are becoming a huge issue in developed countries.

If alliances are the next step but historically they are not successfully kept together, maybe there is an opportunity to provide a management service to groups and take the vested interest out of the equation.

The Australian Beef Industry is pretty well managed by and large. The parties involved understand the synergies that are involved all along the supply chain. This is better than in the USA.

Off farm investment (if undertaken) takes a great deal of resources (not least time). Understand this and make your decisions to move in this direction on this proviso.

Farmers cannot allow themselves to not be with the leading edge of technology. If we are left behind then the margins in business will evaporate. By the same token we cannot be out on the pointy end!

Environmental health is the next big issue for Australia. We should be looking for ways to improve our self-regulation before Government feels they have to Legislate!

How do we achieve business protection? Get bigger by buying land? Integrate into supply chain? Consolidate what we have? Invest outside core business? What are our objectives (business and personal)? When the objectives are set then the way we get there can be worked on.

Heifer Development. Interesting program where you allow a specialist to raise your heifers. They will select them if you want then join them to what Bull you want then pregnancy test them and ship them back. Nice fee for service set-up! This may become very lucrative if composite breeds become more popular. A Seed-stock producer can breed replacements for a fee.

Irrigation is king.

Any infrastructure that we build or develop needs to have more than one use. I.e. that new hayshed is going to store hay but also machinery or potentially grain in a big harvest year. The new tractor has to be capable of being used many months of the year for different roles. For this reason I don't see the value in buying Headers!

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