final report

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Economic impact and barriers to adoption of hang methods to improve eating quality in Australian beef and lamb

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Summary

This report examines the reasons for the limited uptake of a different process of hanging a carcase in a chiller entitled Tenderstretch. This different hanging method has the effect of placing the majority of muscles in the carcase in tension and has the result of improving the eating quality outcomes for almost all of the muscles in the carcase.

Despite these improvements in eating quality the adoption rate across all of the supply chain has been low. The reasons for this are investigated and can be summarised as:-

- Tenderstretching costs more to implement because an extra process of transferring the hook attachment point is required from the Achilles tendon to the Aitch bone.
- This process in beef means that fewer carcases can be stacked in a chiller.
- The resulting chilled carcase has hindquarter muscles that are now a different shape that need to be boned using boning techniques.
- This has issues with boners who struggle to switch form one method to the other. If 100% of either hanging method is undertaken the productivity is similar but is reduced when there is a mixture of both hanging types.
- The low volume uptake means that sourcing a Tenderstretched carcase for a wholesaler or a Butcher is not easy and there is reluctance by wholesalers to encourage the use or broadcast the benefits of Tenderstretching to their customers.
- Export processors also gain a benefit despite the inherent benefit gained form time for a cut in a vacuum bag during transport. But exporters have a large number of different customers (and they have customers) with whom they need to communicate the changes to the muscle shape that can be expected from a Tenderstretched carcase as well as extolling the benefits that will be received.
- The overall cost to build beef chiller capacity to replace that space lost due to Tenderstretching as well as operating the Tenderstretch system with a hook-swap station is of the order of $1.45 per head.
- Several suggestions are proposed where MLA can play a role in additional training and education to improve the uptake and adoption of Tenderstretch.

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1. Introduction

The Red Meat Industry has been researching how to improve eating quality and whilst substantial gains have been made, this process will be ongoing. One of the major outcomes of this research has been the Meat Standards Australia (MSA) program which has a number of pathways to underpin the improvements in eating quality that can be expected under this grading system.

One of the major attributes within this MSA system can be Tenderstretch. A carcase can be hung prior to the onset of rigor in the traditional manner by the Achilles tendon or using the Tenderstretch method, by the Aitch bone (hip bone). Research has shown that ageing will occur more rapidly than the traditional Achilles hung equivalents. However, Tenderstretch technology is not new with the CSIRO publishing a paper in 1972 [1] extoling the benefits of such a method.

When carcases are hung by the Aitch bone the rear leg rotates to a 90 degree angle to the vertical. This action keeps some muscles in tension or in a stretched position so that they cannot contract during the onset of rigor. When hung conventionally via the rear tendon, the rear leg muscles are not in tension and are not prevented from ‘contracting’ during chilling and during rigor mortis.

This means that in Tenderstretched carcases, the eating quality of those muscles that have gone through rigor mortis in tension have an improved eating quality. This applies to most of the hindquarter muscles. There are some muscles that during the Tenderstretch process, are not placed under tension and do not see the improvement. According to a more recent research report from Food Science Australia [2] the Rump; Striploin; Outside Flat; Topside and Cube Roll cuts all achieve an improvement in eating quality whilst the Eye Round, Blade and Brisket exhibit no improvement. The Tenderloin shows a decrease in eating quality

The process of Tenderstretching is relatively simple and inexpensive. It requires one labour person (up to approximately 800 head per day throughput although more can be accommodated with some mechanical assistance of the Hook Swap) to hang the carcase via the aitch bone using string, rope or stainless steel hooks. The most common method is to use stainless steel hooks that connect with the carcase either under the Illiosacral Ligament or under the pelvic bone or both. Heavier carcases definitely need the 2 hooks to sop carcases ending up on the floor during chilling as a result of the hooks tearing through the tendon or through the bone, especially if some soft siding has weakened the pelvic bone on one side.

The estimated cost of Tenderstretching up to 800 carcases per day is $1.45 per head. This includes labour to undertake the hook-swap, cost of additional chiller space to compensate for the loss of carcase packing and other operational cost. These have been estimated in Appendix 1.

The significant improvements in eating quality gained by Tenderstretching a carcase has not realised any significant industry adoption. A survey was undertaken of several major beef and lamb processors, exporters and domestic processor; butchers and wholesalers, with users and non-users of the Tenderstretch process, both via telephone and face to face contact and. Of these many different stakeholders within the industry suggests that there are several scenarios.

1. Those that have a passion to deliver the best eating quality experience to the end user and embrace the technology and operate within a culture where the eating experience by the customer is the focus.
2. Those who believe the science or are motivated by the MSA grading rules for financial reward and use Tenderstretch to move more of their carcases into a higher MSA grade generally due to Bos indicus content.
3. Those that believe in the Tenderstretch science but do not have a passion to provide the best eating quality to their customers or have other concerns such as the cost to implement.
4. Those that do not believe Tenderstretch gives any improvement.

This break-up of stakeholders is represented across all aspects of the processing and supply chain from large export processors to individual butchers. The result being sought by MLA is to move more of the stakeholders into the first category and the greater adoption of Tenderstretch. This report seeks to examine the reasons as to why these scenarios are present and to suggest ways to move more into the first is the first category.

2. The issues around Tenderstretching

The action of Tenderstretching a beef and lamb carcase results in a number of challenges.

2.1 These are for <u>beef</u>

2.1.1 Hook swap

Requires one labour unit plus some capital cost for an elevated operating platform to affect the hook swap. One labour unit is necessary for throughput rate of up to 800 carcases per day although this potentially could be increased with some more engineering improvements.

The process of hooking the carcase requires the purchase rope or twine as an ongoing cost or the purchase of sufficient hooks to supply at least 2 days of Tenderstretched carcases. Most processors have gone to a double hook (see Figure 2 below) so that both the aitch bone and the Illiosacral Ligament are connected to a hook. Experience has shown that if the splitting saw has been a little inaccurate the aitch bone can be very thin and break with extended hanging. A similar event can

happen with the Illiosacral Ligament pulling through and allowing the carcase to drop to the chiller floor.

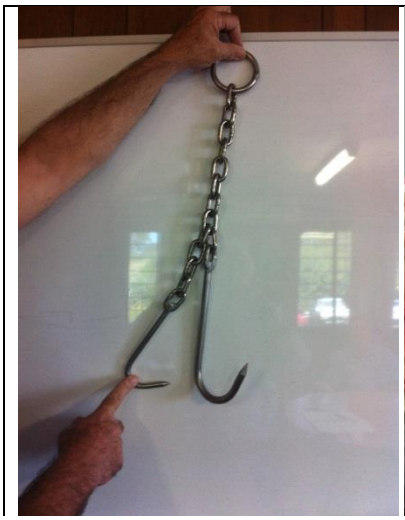

Figure 1: Double Hook Configuration

Figure 2: Hook in Aitch Bone

Figure 3: Hook in Illiosacral Ligament

Figure 4: Pneumatic Assist for Higher Production Hook Swap

2.1.2 Loss of chilling space

The Tenderstretched carcase takes on a slightly different shape and a different hanging angle as shown in the following images.

Figure 5: Tenderstretch Carcase showing hanging angle

This angle of hang means that some chiller space is lost when the carcases are stacked in the chiller if the need for any part of one carcase touching the next is adhered to.

The spacing of the rails in the chiller can also reduce the capacity of the chiller. If the rails are less than 900-1000 mm apart then the carcases have to be oriented to fit into the gap of the one on the adjacent rail. The pictures below demonstrate how much extra space a Tenderstretched carcase takes up.

Figure 6: Two Different hanging Methods

The percentage of chiller space lost is a function of chiller rail spacing and carcase weight with the heavier carcases having thicker bodies and longer legs, both of which can reduce chiller capacity. One processor who was fortunate enough to have very wide rail spacing was able to arrange the stacking of carcases such that they lost no chiller capacity whilst another with narrower rail pitch lost approximately 20% of the chiller's volume capacity.

What this means as far as nett loss to the processor is difficult to determine since it means a loss of production of 20% or a drop in turnover by 20% with a flow-on drop in overall business profit.

An estimated cost to construct and operate extra chillers has been undertaken in Appendix 1. Whilst this is not the same as the loss of production costs, it gives an indication of the total cost of undertaking Tenderstretching by increasing the number of chillers to compensate for this loss of chilling capacity and allow a plant to again process at full capacity.

This estimate suggests that the additional cost of undertaking Tenderstretching on 100% of carcases for an 800 head a day plant is in the order of $1.45 per carcase. This includes the operating cost to perform the tenderstretch process; to chill the additional carcases in anew chiller and to provide the extra 20% chilling capacity lost due to Tenderstretch carcases consuming more space.

2.1.3 Boning is more difficult

The action of Tenderstretching changes the way the carcase hangs and as a result shape of the muscles in the hindquarter; predominantly the Rump, Tenderloin and Knuckle. It makes the butchery process different to the untrained boner since it alters the shape of these muscles.

To the inexperienced boner, it is more difficult to bone compared to what they have been used to with an Achilles hung carcase. It must be noted that processors or butchers who are experienced with boning a Tenderstretched carcase have found that within a small period of time of (approximately 4 weeks), the productivity of boners with appropriate training, is equivalent to where they were when boning an Achilles hung carcase.

It also needs to be noted that this applies to boners who are boning 100% of their daily allocation on Tenderstretched carcases. It appears that problems arise with boners when they are doing both, Tenderstretched and Achilles hung carcases in the one day and do not get the time to become proficient at the Tenderstretched method.

2.1.4 Boning is much slower

For the reasons listed above the inexperienced boner is less productive on Tenderstretched carcases. How much less productive is difficult to gauge since it depends on the boners experience but 20% could be used as a guide. Unfortunately

this comment came from organisations that were not boning 100% of their production and were generally only boning a small percentage of the available carcases. The comparison in productivity is most likely accurate with the comparison being between boners who were very experienced on an Achilles tendon hung carcse and very inexperienced on Tenderstretched carcases. Processors who were doing the majority of Tenderstretched carcases noted that the productivity was equivalent once the boner had the experience.

2.1.5 Different shaped primals

As a result of the Rump, Tenderloin and Knuckle changing shape and thence the slightly different shape of the cutting lines in separating the primals, the boneless cut has a different shape compared to an Achilles hung carcase. This can cause an issue with a customer who is expecting a primal of a certain shape and something different arrives. The inference was that customers did not like change and did not want change. However, processor who had the culture of providing the best eating quality meat for their customers had spent the time to communicate and work with their customers and point out the benefits of the better eating quality had found great customer acceptance.

2.1.6 Loss of product during boning

Some butcher shops have reported losing up to $18.00 dollars a carcase with the change in the cutting lines resulting in more trim and the need to cut the trim from an the tenderloin. The tenderloin in the Tenderstretched carcase, when still on the hindquarter is bent. It requires the boner to cut up significantly higher than normal to release the tenderloin. Failure to do this can leave some of the tenderloin still on the carcase. Whilst this sounds simple, the tenderloin is not nearly as easily accessed in the Tenderstretched carcase nor is it as easy to see where it starts and stops.

It was reported that on the tests undertaken, there was a significant loss of weight as the primal was trimmed when boning a Tenderstretched carcase. It was also reported that this can happen if the butcher has not been trained properly in how to perform the boning applicable to a Tenderstretched carcase. Once trained properly and with some experience, there is no change in the weight of primals and no change in trim levels.

2.2 These are for lamb

The process for lamb is a little easier since the lamb carcase weight of approximately 20 Kgs is significantly different from a side weight of 150 kgs, however, similar issues do apply to lamb as for beef.

2.2.1 Hook Swap

There has been no need for a hook swap thus far as lamb size and height mean that the carcases can be man handled in the chiller. It has as yet to be proven however

for a large number processed on a regular basis if any Workplace Health and Safety Issues arise from the manual handling.

2.2.2 Loss of chilling space

Loss of shilling space is expected to occur but it is not considered to be as large a percentage compared with beef since the carcases are so much smaller and can pack together closely in the carcase form. Of more concern will how the person manoeuvring through the chillers cope in order to mark the carcase with the vegetable die roller since the way Tenderstretched carcases will be stacked may make this more difficult. In most pants, carcases can be marked on entry to the chiller before being sent down a rail although this is not preferred.

2.2.3 Boning is more difficult

This is not expected to be an issue as the muscles are so much smaller and any shape change will hardly be noticed

2.2.4 Boning is much slower

Same as above and it is also worth noting that there is a large % of lamb sold as bone in primals such as legs and shoulders which means that primal shape becomes less of an issue.

2.2.5 Different shaped primals

Although potentially an issue initially the time to reach full productivity is considered very short because the muscle sizes are so much smaller than beef primals.

2.2.6 Loss of product during boning

There have been no reports of this being an issue but there are very few butchers boning Tenderstretched carcases.

2.2.7 Other specific issues attributable to lamb

The comments below were also noted during discussions with Butchers or processors selling Lamb.

- Tenderstretch is not needed since the animals are so young anyway, they will always eat well
- Purchasing carcases from a processor who wholesale lambs to butcher shops can be difficult if they are Tenderstretched. With normal carcases there is a person who chooses my carcases for me after chilling and allocates them to my business. If the carcases are chosen hot and then Tenderstretched, they may not be quite what I want after chilling but now I am forced to purchase

3. The users of Tenderstretch

These comments below apply to beef in particular but similar comments could generally equally apply to Lamb. The rollout of MSA to lamb is not nearly as advanced as it is with beef and hence the understanding and use of Tenderstretch in lambs is much lower.

3.1 Domestic processors

These processors can supply to a wide range of customers

These can be:-

- Supermarkets
- Butchers
- Food Service Customers
- Wholesalers

These markets have the following Issues:-

3.1.1 Supermarkets

In general supermarkets have embraced the MSA model. In the areas where the Bos Indicus content is low, the use of Tenderstretch has been limited since the cattle are able to make a commercially acceptable MSA grade without the need for Tenderstretch to observably improve the eating experience. All 3 major supermarkets are working towards having all of their cattle and eventually lamb fit into an MSA graded category.

There are some difficulties in doing this since moist supermarkets process their sheep and beef at a range of different processing establishments. Many of these processors do not Tenderstretch their carcases. For the Supermarkets to request that they do is going to add cost to their product. The processors who process for the supermarkets also process for other customers who have little interest in Tenderstretching hence there would be a “Special” run for Tenderstretch carcases and would come with all of the problems already listed such as reduction in boner productivity, change in primal shape, more difficult boning and hence boner disgruntlement, added cost as result of chiller space reduction, hook swap labour and loss of boner productivity.

Two of the major Supermarkets happen to process their beef carcases in the Brisbane area. The feedlots supplying the cattle to the supermarkets have difficulty sourcing low Bos Indicus content cattle and hence can struggle for their carcases to meet the required MSA grade as a result. The additional benefits provided by Tenderstretching ensures that these cattle meet the grade and hence these Supermarkets have embraced 100% Tenderstretched product for all of their production.

This means that the problems that can arise in a 'typical' Service Kill processor do not arise because the boners in these Service Kill works, are undertaking 100% of the cattle as Tenderstretched cattle and hence productivity returns to the level equivalent to processing Achilles hung carcases.

Fortunately for the Supermarkets, that process cattle through the Service kill processors who are dedicated almost 100% to processing their cattle, something that is not the case in other areas, particularly southern states. Both processors for the supermarkets were also fortunate that either the Service Kill processor had excess chilling capacity or had large spacing between rails such that no loss of chilling capacity resulted due to tenderstretch. In short, in both cases the move to tenderstretch was 'easy'!

3.1.2 Butchers

Despite MLA having a very active and comprehensive education, support and training program with the Butcher fraternity, views are significantly divided.

The opinions range from:-

- Tenderstretch is all a load of rot and the butchers do not believe that it works
- I have heard a little bit about it but the way we do it now seems to work ok so why would I change?
- The science is good but it is too hard to implement.
- Unsure of the science behind Tenderstretch but I have tried it and lost on average $18.00 per carcase.
- The science is sound but I will not implement it because with a Tenderstretched carcase I am basically buying the carcase as it is in the 'Hot' state. Once the carcase is Tenderstretched I am obliged to take it irrespective of the considered "quality" of the carcse after chilling. "I could end up with a bunch of dark cutters." The abattoir people know the sort of carcse I want and they select it for my butcher shop.
- Have no need for Tenderstretch since I pay for someone to purpose pick my carcases off the processors chiller rail and that gives us good quality.
- The science is supporting what I already know and have been having all of my carcases Tenderstretched for a long time. "many of my customers tell me that I have the best meat in the region"

Generally there was not the eating quality culture within the Butcher shops. They were doing what all of the others were doing and accepting that as good enough. Those few that were Tenderstretching were not broadcasting what they were doing in a strategy that had a basis of relying on the customers returning because they had had such good eating experience from the product previously. There was no fear of competition from the supermarkets who were selling MSA graded beef for several reasons:-

- Most butchers did not know that the supermarkets were selling MSA product nor did they see this as potentially competition to them or what impact that might have on their businesses either in initial purchases or repeat business. Some butchers that had tried MSA and were not convinced of the programs benefits did not see MSA product from the supermarkets as a threat.
- They felt that their customers were in their stores because they were looking for a different experience compared to what the customers received from the supermarkets. The experience the butcher's customers sought may have been one of a thick cut steak or advice on how to cook a leg of lamb or help in sizing a leg of lamb for an occasion. It was definitely not the "pick up and go" mentality.

3.1.3 Food service customers

Most food service organisations purchase their meat in the Carton. When this is the case, then they do not specify Tenderstretch because they know it will not be supplied. The Food service organisations generally do not purchase the whole carcase but only the cuts that they need for their customers. If they were able to source a Tenderstretch carcase from a Processor or Wholesaler, then what cuts they do not take from that carcase still need to be sold. The Food service customer to the processor may want the whole hindquarter except for the rumps on a particular order. The processor is then left to sell that rump to other customers, but now has a rump that looks different from most of the other rumps unless they too were Tenderstretched. This makes these rumps difficult to sell to any of the processors other customers and hence this can be a disincentive to the processor to supply Tenderstretched carcases to the wholesaler.

3.1.4 Wholesalers

Wholesalers source their product from domestic abattoirs, export abattoirs and service kill processors. They normally have a customer to whom the product is destined. They do not seem to have any impetus to encourage their customers to adopt Tenderstretch and rather respond only to their customers' requests. Very few of their customers seem to be requesting Tenderstretched carcases. There was not any enthusiasm to adopt anything different to improve eating quality in fact there appeared to be quite some apathy regarding any new technology that would change the status quo. If a customer of a wholesale knew that there could be a substantial improvement in eating quality and hence in their customer's satisfaction for such a small cost, it is believed there would be a higher uptake.

3.1.5 Service kill providers

Service kill providers are a specific type of domestic and export processor. Both domestic and export processors also can operate a portion of their business as a service kill arrangement. Service kill operators are under orders from their customer to process a certain way at a certain cost and have little direct influence into changes

to the process that may improve eating quality. However, the experience gained when discussing the arrangements with Service kill operators suggested that there was very little dialogue between the parties on the way to process the animals. Service kill operators potentially could be strong advocates for encouraging processes such as Tenderstretch.

The specific processors that were providing a fee for service of processing lambs and beef carcases were again very non enthusiastic. The general feeling amongst some was that the Tenderstretch technology did not work and they in no way encouraged any of their customers to adopt anything new. There was also significant scepticism regarding the benefits of MSA.

Several of the Service Kill processors had the infrastructure to perform the hook-swap and had developed pricing structures to modify the fee accordingly but they were not outwardly encouraging customers to make use of their capability to improve the eating quality of the product. When asked why some of their customers either did or did not specify Tenderstretching, there was a definite lack of knowledge of their customers business.

3.2 Export processors

Whilst export processors do export a quantity of their product, they also process a range of cattle that will go to many different markets. Export processors are very similar to domestic processors having potentially a wide a variety of domestic customers such as wholesalers; food service; supermarkets as well as a range of export customers and a range of export category product and some cattle destined to be packed as trim for frozen export.

For the product that is exported, these processors have an added advantage since the science suggests that the benefits of Tenderstretching is still in effect 30 days after slaughter and is providing more of an improvement until around this 30 days than does the improvement gained form the anaerobic aging process of the chilled product. Most exported product arrives at its destination within the 30 day period of influence from Tenderstretching. Tenderstretching would therefore provide export customers with a better eating quality product than is being provided now.

However, if only the export carcases are Tenderstretched then what to do with those carcases that are destined for the domestic market? To Tenderstretch the export carcases and not the domestic carcases would be to split the boning room into two different methods of boning which would lead to gross inefficiencies.

What about the ‘cracker cows’ or bulls which are generally destined for the 100% frozen trim market? There is no eating quality case to justify the spending of the extra cost to Tenderstretch these carcases when they will end up most likely being ground for hamburger patties.

One exporter who has a culture of providing the best eating quality meat possible to their customers has such a breakup of customers and has spent the time to:-

1. Modify the plant to enable an efficient hook swap and to cope with 100% of the days production
2. Accepted a 10% loss in chiller storage capacity which is low by some meat processors but is a function of existing rail spacing.
3. Worked with their domestic and export customers and convinced them of the benefits of the improved eating quality.
4. Has worked through with their customers regarding the changed shape of the primals as they will appear when the box is opened and their customers have worked through with the end user such as food service, to explain the benefits
5. Has spent the time to educate and train their boners in the different method of boning and now bone 100% of their carcases in the Tenderstretched position.
6. Have accepted the short term loss of productivity from their boners whilst in training until they have become proficient and as productive as before
7. Has fully adopted Tenderstretch for every carcase processed including any destined for the frozen boxed trim. Whilst this has a cost without any appreciable benefit, the philosophy was taken that it is better to do every carcase processed min exactly the same way so that the slicers do not need to switch between boning methods and chiller stacking was always the same.

This business has been able to continue growing in the face of some difficult times and use the improved eating quality message as a sales tool to continue to grow their business. This business revolves around providing the best eating experience to their customers thus suggesting that it can be done but now the challenge is how to energise the same culture in other exporters.

4. Possible ways of moving forward

4.1 Is there a financial benefit?

There has been no discussion so far regarding the costs and the financial benefits of undertaking Tenderstretch on carcases. Other reports commissioned by MLA [3]suggest that the benefit of Tenderstretching is of the order of $0.50 cents per Kilogram. The costs on the other hand are around $5.00 per head (or ¼ cent per Kg for a 200 Kg carcase) to have a service kill works hang a carcase by the aitch bone and to chill in this position. The actual cost of Tenderstretching is probably around $4.00 since the Service Kill processors would be making a margin on their real costs.

If the benefits can be derived from the customer then there is a substantial margin to be gained.

Examining the stakeholders and their likelihood of driving a benefit

Sector	Would 50^{c}/kg be realised from use of Tenderstretch?
Domestic Processor Supplying:-	
Supermarket	Probably not initially particularly if already undertaking MSA program. May choose to do Tenderstretch to move some high Bos Indicus cattle content to qualify for MSA. Competition from other Supermarkets will keep prices low. Price is most likely already into cost/ benefit of doing MSA
Butchers	Not if all butchers and Supermarkets are doing the same and then Tenderstretch would be a "stay in business decision". However, they potentially could derive this benefit if no other Butcher is selling Tenderstretched product locally and will gain repeat business.
Food Service Wholesalers	Unlikely since they are passing on the cost from the processor plus a margin.
Service Kill Processors	Not really applicable since these processors are under instructions from their customers. These processors would recover their cost plus a margin charging approximately $5.00 per head for Tenderstretch.
Export Processors Supplying:-	
Export Customers	Probably not in the near term since an Export Processor needs to spend the effort in convincing all of their international customers of the benefits of Tenderstretch and to expect a different shape on some of the Primals. Potentially have to work with their customers who are actually using the product to convince them of the benefits and for them to accept the changes in shape. They would need 100% of their customers to agree and accept the change otherwise they would have operational issues in chillers and boning rooms with Achilles hung and Tenderstretch carcases.

This analysis suggests that if nothing changes, Butchers for example, will not be rushing to switch to specifying and purchasing Tenderstretched carcases based on financial returns given all of the issues with supply from a service kill processor or a wholesaler.

4.2 What can be done?

There seems to be a chicken and egg situation. Domestic Processors do not really want to do small sections of their daily kill as Tenderstretched carcases because of the problems it causes, predominantly in the boning room with boners struggling to "mix and match" the hanging techniques.

Export Processors do not want to undertake Tenderstretch because of the large effort involved in education their customers and then their customer's customer, of

the benefits of Tenderstretching and why they can expect a different shaped primal. Unless there was a major shift in the culture then for an Exporter, it would be of more benefit to undertake MSA than Tenderstretch since they have the improvement in eating quality without any change in primal shape.

This in some respects reflects the “Commodity” thinking that is applied to the beef product in particular. There is yet to occur a complete culture change that says that eating quality is the goal and needs to be achieved providing the cost is reasonable. There is an opportunity here for education to demonstrate how little extra per carcase Tenderstretching costs and what benefits can be delivered.

If all domestic processors and service kill processors undertook Tenderstretch on 100% of their carcases processed, then the issue would be solved.

In developing the components of an industry strategy to drive change and increase significantly the volume of Tenderstretched carcases the first step would be identify that sector which has the greatest reason to change.

Then,

Identify via an Ease/Impact grid on which group within that sector would:-

a. be the easiest to change
b. secure the greatest Impact or benefit the most

Such a grid may look like the following:-

Sector Domestic Processor Supplying:-	How **Easy** would it be to do – (Ease - Score 1-10, 10= easy)
Supermarket	9
Butchers	9
Food Service	9
Wholesalers	9
Service Kill Processors	8
Export Processors Supplying:-	
Export Customers	7

Sector Domestic Processor Supplying:-	What **Impact/Benefit** would be achieved? (Impact Score 1-10, 10= High impact)
Supermarket	4
Butchers	9
Food Service	3
Wholesalers	9
Service Kill Processors	9
Export Processors Supplying:-	
Export Customers	4

The reason for these scores:-

The following briefly justifies the score given.

Ease or – how easy would this be for a Processor to Implement

Supermarket

Score 9– High Score - Reflects the ease with which a Supermarket could change the product specification only and their processors would respond.

Butchers

High Score = 9 Reflects the ease with which they could change their specification to their Wholesalers or suppliers to include Tenderstretching. Some Butchers are already doing this now.

Food service

High Score=9 – Reflects the easy changes that could be made to specifications to include primals supplied from Tenderstretched carcases.

Wholesalers

High Score =9 Reflects the ease of changing their specification to their suppliers/ processors

Service kill processors

High Score = 8 – Reflects the simplicity of implementing a system and cost recoverable from their clients. Some loss of chiller space lowers score somewhat.

Export processors

Medium Score = 7 – Reflects the issues of the Hook-Swap and labour costs that are not easily recoverable and loss of chilling space

Impact or what impact would this have on their business specifically in $'s

Supermarket

Low Score 4 –Reflects the low impact this would have since supermarkets are already undertaking and committed to rolling out MSA so the improvements in eating quality would be marginal

Butchers

High Score = 9 reflects the improvement in the eating experience of their customers and subsequent repeat business. Also reflects the reduction in the threat level from the "better" meat from supermarkets

Food service

Low Score=3 – Reflects the issues that they would have with the end user being supplied with primals that are a different shape.

Wholesalers

High Score =9 Reflects the improvement in eating quality that their customers would experience

Service kill processors

High Score = 9 – Reflects the simplifying of their boning and recovery of costs for Tenderstretching

Export processors

Low Score = 4 – Reflects the issues and effort needed working with their customers in order to supply primals that are a different shape

The Graph Below shows the results graphically

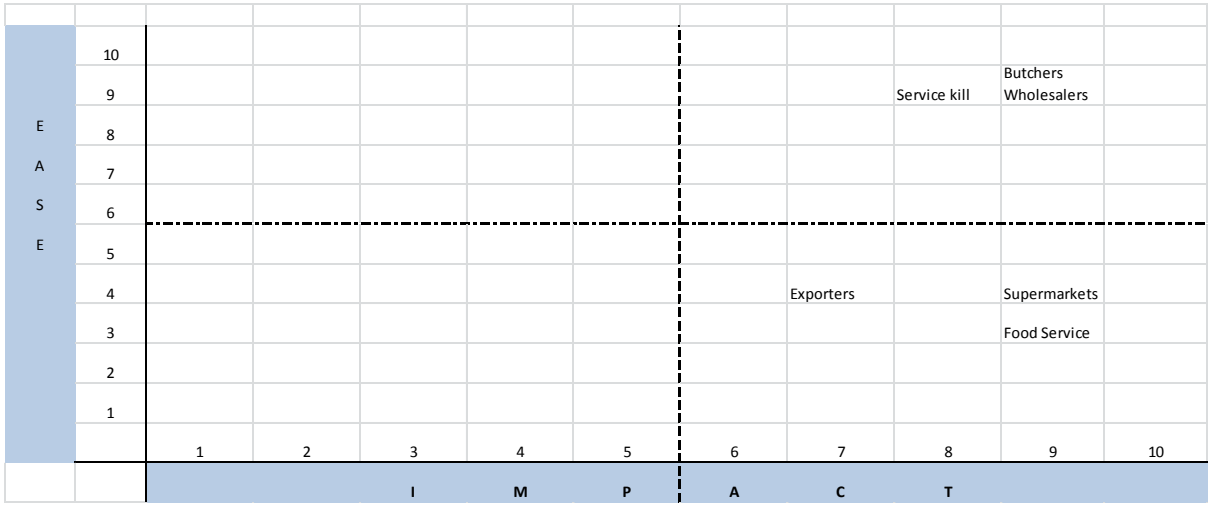

Figure 4: Plot of ease v's impact scores

The graph above shows some processors in the top right quadrant, i.e. High Impact and Easy to achieve or implement. These are the sectors that are best addressed first.

Since the Butchers purchase from the Wholesalers and are supplied by the Service Kill plants, then it makes sense to focus first on the butchers and their needs.

The butchers had a number of issues as described below along with a potential area of emphasis to raise uptake and awareness. If the issue or problem can be dealt with, then there are fewer reasons for butchers “not” to use the Tenderstretch method

4.3 Solving the butchers needs

The Butchers interviewed note the following problems as to why Tenderstretching was not adopted.

Sector Butchers	Identified Problem	Path to a solution
	"Tenderstretch is all a load of rot and the butchers do not believe that it works"	• Undertake additional education and training sessions specifically aimed at Tenderstretch • Taste panels with one side (beef) or one Lamb Achilles Hung and the other Tenderstretched and compare eating experience • Demonstrate the Science and have Scientists available to answer questions • Gain an Understanding of why this comment is in their belief system • Show Testimonials from other Butchers who know it works • .Include Tenderstretch on the Australian Butchers Guild Web page on MSA
	I have heard a little bit about it but the way we do it now seems to work ok so why would I change?	Run sessions / Newsletters through Butcher Organisation discussing:- • Threat from Supermarkets as consumers experience the benefit of MSA and explain how this will hurt their business. • The overall benefits of Tenderstretch and how it helps the eating experience backed up by taste tests • Include representatives of Wholesaler and Processors to explain how they can order Tenderstretched carcases and how the issues that butchers may have with the Processor can be solved.
	The science is good but it is too hard to implement.	
	Unsure of the science behind Tenderstretch but I have tried it and lost on average $18.00 per carcase.	As part of the education sessions run training video's to show how Butchers using Tenderstretch are doing it now and NOT losing any money on a Tenderstretched Carcase
	The science is sound but I will not implement it because with a Tenderstretched carcase I am basically	This is a difficult problem. If all carcases were Tenderstretched then there would not be any issues. There are very few carcases Tenderstretched at the moment and hence this is a concern. Need to discuss this concern in

Sector Butchers	Identified Problem	Path to a solution
	buying the carcase as it is in the 'Hot' state. Once the carcase is Tenderstretched I am obliged to take it irrespective of the considered "quality" of the carcases after chilling. "I could end up with a bunch of dark cutters." The abattoir people know the sort of carcase I want and they select it for my butcher shop. Right now I am paying a premium I know to get the carcases I want.	more detail with the Wholesalers and processors as to how this can be alleviated. Possibly needs training of Carcase selectors at the abattoir or to have the processor to agree not to force a sale of the carcase has a Dark' score on Meat Colour. Holistic approach to processors and wholesalers required with a focussed concerted approach.
	Have no need for Tenderstretch since I pay for someone to purpose pick my carcases off the processors chiller rail and that gives us good quality.	Education and training needed here. Possibly a demonstration and eating test to show that even with the best chosen carcase the Tenderstretched on will still eat better. Need to explain that the Tenderstretch improves the eating quality even more. If there is no change then potentially a drift of the public away from the Independent Butchers to the Supermarkets because of their general adoption of MSA. Potential for all Butchers to be branded as having Tougher meat than butchers making all butchers plight more difficult Explain that this could be in the longer term a "stay-in business decision and not an investment decision.
	The science is supporting what I already know and have been having all of my carcases Tenderstretched for a long time. "many of my customers tell me that I have the best meat in the region"	Use these Butchers as Testimonials and trainers for boning.

4.4 The impact of MSA on butchers adopting Tenderstretching

In a funny way, MSA is a deterrent for butchers to adopt Tenderstretching. Many butchers have noted that “all that MSA crap is too difficult and costs too much for the benefit” and then they do not adopt MSA and nor do they adopt Tenderstretch to get the large percentage of the MSA advantage.

Had the MSA model been to convince Butchers to adopt Tenderstretch first, and then come back and convinced them of the MSA benefits next, then there would be significantly more widespread adoption of Tenderstretch. MSA seems to only use the Tenderstretch requirement where there is a higher than allowable Bos Indicus content and Tenderstretching drops the number of days ageing to reach a MSA grade equivalent to a low Bos Indicus content.

This perpetuates the low slaughter numbers of cattle (or soon to be lamb) that have been Tenderstretched.

4.5 Solving the wholesalers and service kill processors needs

This sector, particularly the Service Kill processors, would like either 0% or 100% Tenderstretching in their process. Anything else results in their boning room potentially having to learn to perform the boning of a Tenderstretched carcase and potentially switch between boning an Achilles hung or a Tenderstretch boning method several times a day depending on which customers cattle or lambs are being processed. With lambs this is unlikely to be an issue but certainly stacking both methods of hanging into the chillers in a lamb plant will cause some consternation.

Sector	Identified Problem	Path to a solution
Wholesalers and Service Kill Processors		
	Do not believe in the benefit of Tenderstretch and hence do not encourage their customers to use it.	• Provide specific education, trials eating tests etc.as outlined in this section relating to the Butchers • Encourage all members in this supply chain to use Tenderstretch and spread the word of the benefits such that the percentage of Tenderstretched carcases increases. • Identify and target several big volume users of Wholesalers and /or Service kill processors and focus on convincing them to begin using Tenderstretch so that the Abattoir has a large enough base load of volume of Tenderstretched carcases to justify the change • The Supermarkets are undertaking a program of MSA in lamb as this report is being written. Hopefully this will include Tenderstretch although discussions with some Supermarkets suppliers suggest that Tenderstretching has yet to be discussed.
	Have problems boning both methods of hanging carcases especially beef.	Either but probably both:- • Provide training for boners to be able to do both hanging methods efficiently and competently • Encourage all members in this supply chain to use Tenderstretch and spread the word of the benefits such that the percentage of Tenderstretched carcases increases • Identify and target several big volume users of Wholesalers and /or Service kill processors and focus on convincing them to begin using Tenderstretch so that the Abattoir has a large enough base load of volume of Tenderstretched carcases to justify the change

4.6 Solving the export processors needs

The Exporters have the problem of processing a wide mix of different carcases, some for the high value export market but also manufacturing and domestic supply.

With such a wide range of customers they begin to look very similar to the Service Kill processors. The export product

Sector Export Processors	Identified Problem	Path to a solution
	Export Processors have so many customers many of which are International Customers who then on sell the product to many customers in their country. These customers will not be expecting a change of shape in the Key hind quarter primals and it is a mammoth task to convince all of them in sufficient quantities to establish enough volume to begin Tenderstretching.	• Continue educating and encouraging the Exporters regarding the benefits of Tenderstretch and its impact compared to the ageing process in a vacuum packed bag. • Educate the major users in several export markets regarding markets (Could upset the processors by talking to their customers. Expert advice needed here) • MLA trade shows could be one source of providing information to customers so that a dialogue can begin between customer and Processor.
	Have problems in the boning room whereby they will be boning both methods of hanging carcases especially beef.	• Provide training for boners to be able to do both hanging methods efficiently and competently. Boners could practise on the manufacturing carcases where mistakes do not reduce the value of the cut. • Encourage all members in a domestic supply chain to use Tenderstretch and spread the word of the benefits such that the percentage of Tenderstretched carcases increases • Identify and target several big volume domestic users or Supermarkets of Export processors and focus on convincing them to begin using Tenderstretch so that the Processor has a large enough base load of volume of Tenderstretched carcases to justify the changes needed to cope with the 2 hanging methods

5. Bibliography

[1] “CSIRO Meat Research News Letter,” *Periodical from the CSIRO Division of Food Research, Meat Research Laboratory,* pp. 1-5, 25 January 1972.

[2] F. S. Australia, “Meat Technology Update - Tenderstretch Newsletter 1/04,” MLA and AMPC, Sydney, February 2004.

[3] J., Thompson; M., Kelly, “The Economics of Breeding to Improve Eating Quality od Beef Using Tenderness MArker Panels,” Meat and Livestock Australia Ltd., Sydney, 2013.

6. Appendices

Appendix 1:- Estimated costs to undertake Tenderstretching

None of the Beef processor spoken with had details on what it costs to Tenderstretch.

Several of the beef processors that processed under a fee for service model charged an extra fee for those clients that requested the carcases be Tenderstretched.

For these 'fee for service' works, the numbers of head processed for both beef and lamb were low and there was no loss of chiller space as a result of these low numbers. There is little knowledge of how much loss of space if any in a chiller filled with Tenderstretched lamb. For this reason and because and because no special hook-swap station would be required for lamb the cost to undertake would be negligible and has therefore been ignored.

For beef the additional cost of Tenderstretching for a fee for service plant was approximately $2.05 per head. This would include some profit for the processor in these costs, but it is also likely that a "sweetened" deal had also been struck so that the owner of the cattle would process at that facility and would not go to another processor. With such low numbers being processed at such establishments, the loss of chiller space is negligible and thus the costs are not high.

For a processor processing larger volumes however, the loss of chiller space becomes more significant and can to impact on normal production volumes and a reason to not undertake Tenderstretching.

Estimating the costs of Tenderstretching also become difficult since some processors who Tenderstretch, do so only on higher value carcases and not on lower value carcases such as cow etc. For an existing processor the real costs to undertake Tenderstretching is not only the cost to do so but also the loss on profit as a result of not being able to process the same number of carcases due to loss of chiller capacity.

Estimating the real cost costs therefore becomes difficult.

Another way to determine the real; cost of Tenderstretching all of a large volume plant is to estimate the additional cost of increasing the chilling capacity lost as a result of the lower numbers of carcases that can be stored in a chiller.

The costings developed below are based on the following assumptions:-

1. Daily cattle numbers processed is 800
2. 100% of all carcases processed are Tenderstretched

3. This results in a 20% loss of chilling space (assuming the rails in the chiller are not separated by greater than 1000 mm) and hence more chiller space must be built.
4. The capital costs of chillers is based on a quote provided to a large processor approximately 2 years ago and has been upgraded by 15% in price to reflect the time delay
5. The operating cost details have been supplied by a supplier of refrigeration equipment to the meat processing industry
6. One person is capable of handling the Hook-swap
7. An existing refrigeration plant room is available and it is the additional chilling load only that has to be chilled using the existing plant room.
8. There is some diversity when not all chillers would under full chilling load at the same time. This impacts on the power required to chill the carcases.

Cost to Tenderstratech for an existing meat processing facility						
Plant Data	Nominal throughput per day	800	head per day			
	Estimated loss of chiller Cpacity	20.00%				
	Loss of chiller capacity is	160	head			
	Working days per year	240				
Hookswap						
	Initial Capital Cost of Hook swap and Hooks	$70,000.00				
	Labour cost of Hookswap	$55,000.00	per annum			
	Labour On-Cost	20.00%				
	Total Cost of Labour for Hookswap	$66,000	per annum			
	Maintenace costs of Hook-swap pluss Cleaning of Hooks	$84,000	per annum			
	Cost per Head of Hookswap	**$0.72**				
		.				
Extra Chiller Capacity Costs	Capital Cost of a	160	head capacity chiller		$1,507,500	(based on quote received 2 years ago for a 2 x 150 head chillers $2.5 M plus cost of hookswap station
	includes cost of refrigeration connected to an existing plant room					
	Repayment period	10	years			
	Interest rate at 2% above ban bill rate	6.60%				
	Loan Repayments	$17,194	per month			
	Contribution to capital cost of increased quantity of chillers	**$0.090**	per head			
Operating Cost of Chiilers - Refrigeration and Power						
	Installed Chiller Horsepower	45	kW			Note assumes a diversity factor with an existing plant and chilling capacity
	Cost of power/ kW hour	$0.15	cents/kW hour			
	Average Chilling Hours/day	20.0				
	Power Costs	$32,400	per year			
	Maintenace Coats for Compressors etc and other refrigeration coats	$10,000	per year			
	Costs per Head	**$0.22**				
	Total Costs of Tenderstretching	**$1.03**	**per head**			
	Contingency on estimate	40%				
	Total Costs of Tenderstretching	**$1.45**				

This suggests a cost to Tenderstretch of $1.45 per beef carcase. This compares with $2.05 for a service kill beef works