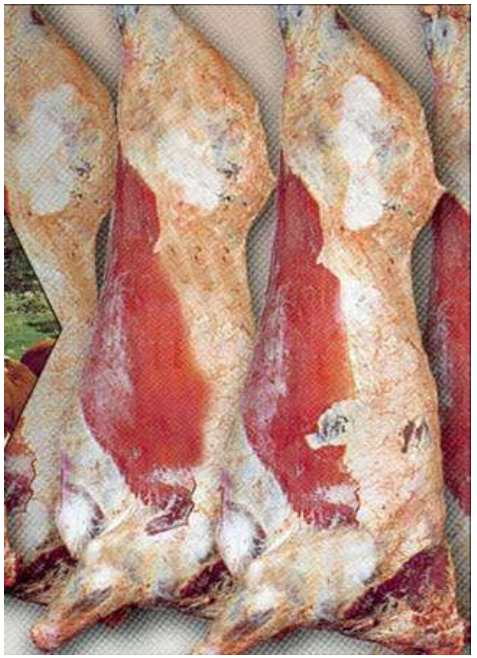
Online processing technologies predicting carcase yield and meat quality traits

What are the implications for producers?

Edwina Toohey, NSWDPI, Beef Development Officer
Graham Centre Beef Forum 15th August 2014

Current Practice

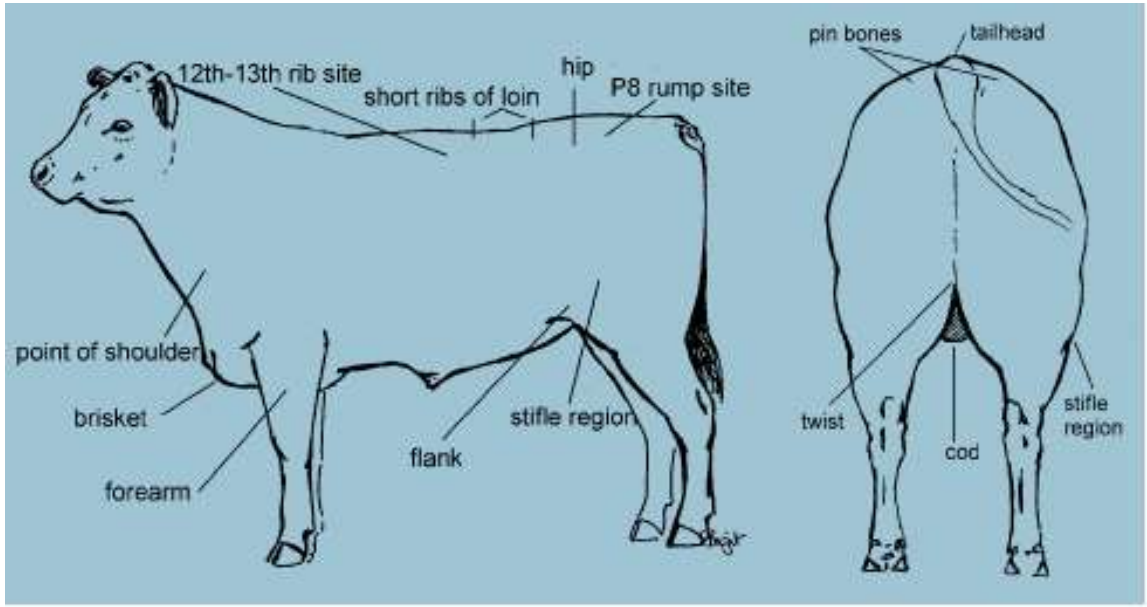
- Cattle are generally sold either on **Liveweight** (e.g. through saleyards, paddock sales, AuctionsPlus) OR by **Carcase Weight** (e.g. over the hook sales)



Cattle sold on liveweight

- The price paid for animals sold on **liveweight** is derived from a predetermined c/kg rate.

- This rate is based on the buyer's **subjective** judgement on traits that are exhibited in the live animal such as;
  - Frame
  - Muscling/shape
  - Age
  - Estimated weight
  - Estimated fatness
  - Sex
  - Breed



Key sites for assessing live cattle (Source; NSW DPI, 2007)

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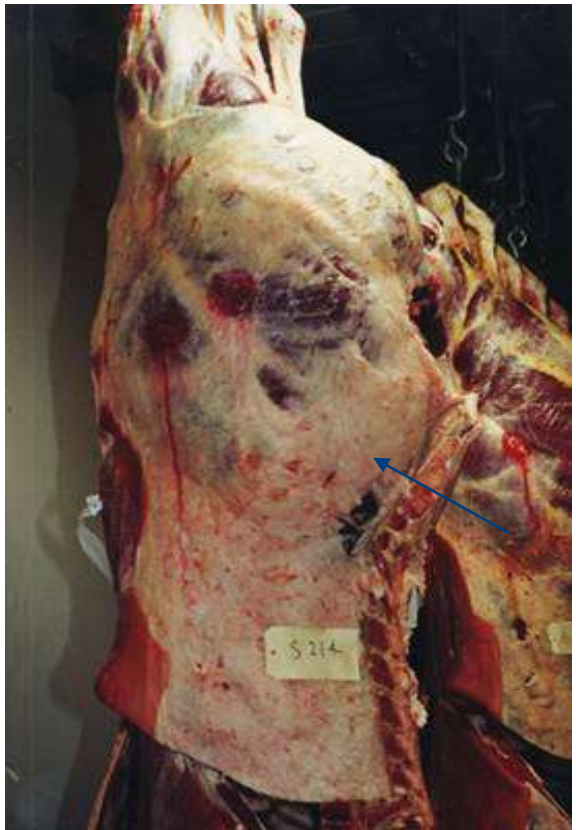
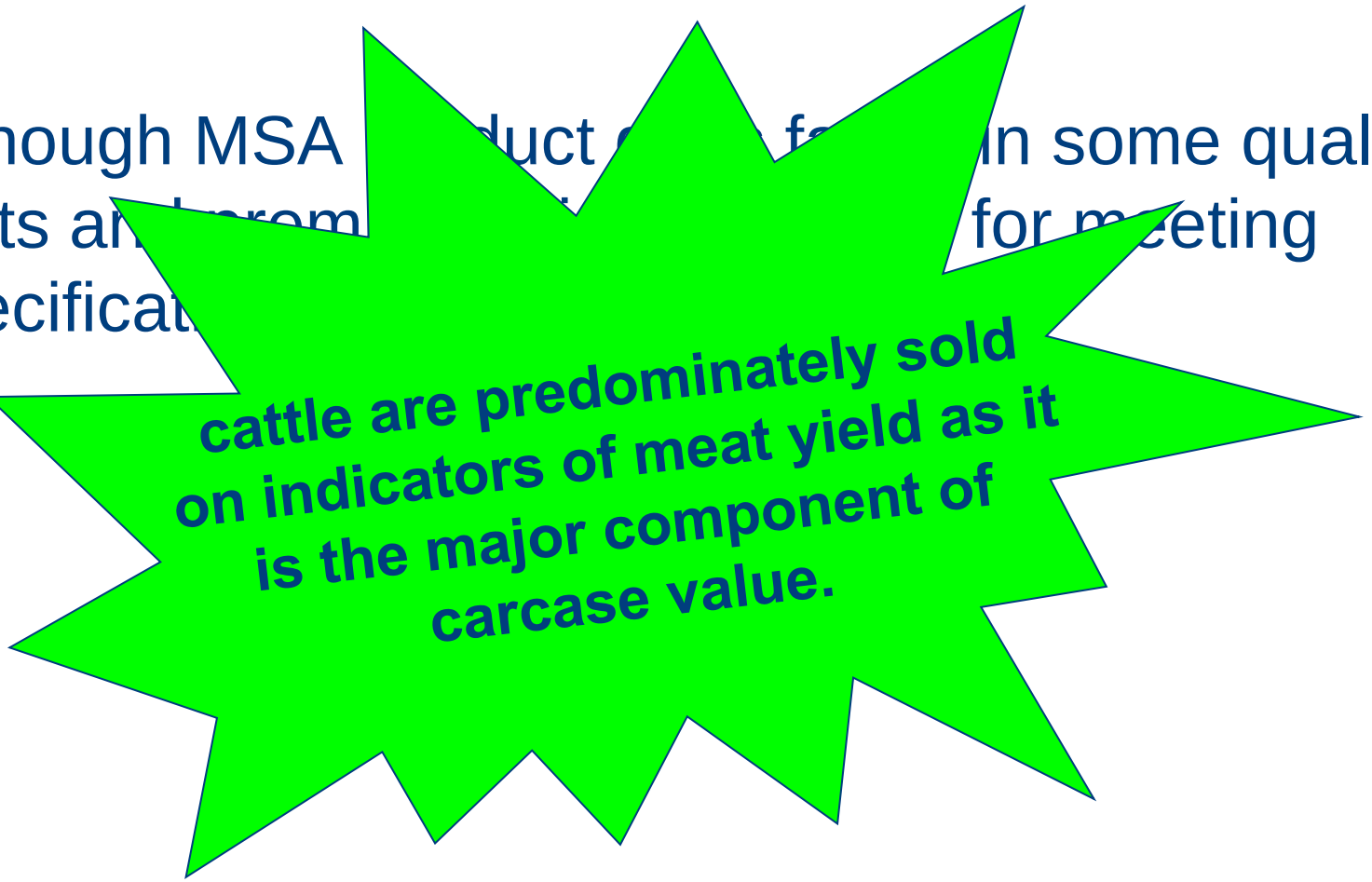
Cattle sold on Carcase Weight

- The price paid for animals that are sold on carcase weight is determined by price grids.
- Cattle price grids have various rates (c/kg) depending on;
  - Grade (vealer, yearling – heifer/steer, grown steer, cow, bull, **MSA** yearling - heifer/steer)
  - Dentition
  - Butt score (subjective)
  - Fat (objective - fat depth P8 site mm)
  - Carcase weight (objective).



Moral to the Story!

- Although MSA [illegible] in some quality traits ar[illegible] for meeting specificat[illegible]



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How will we sell in the future?

- Value based marketing (VBM) is where a producer is paid on the inherent value (including quality and quantity traits) of the product to the buyer and the end user.

- This method provides clear feedback from the customer (processor) to the producer and has pricing systems that support these signals.

- The question is…. Will this be the future? And How will we achieve this as an industry?

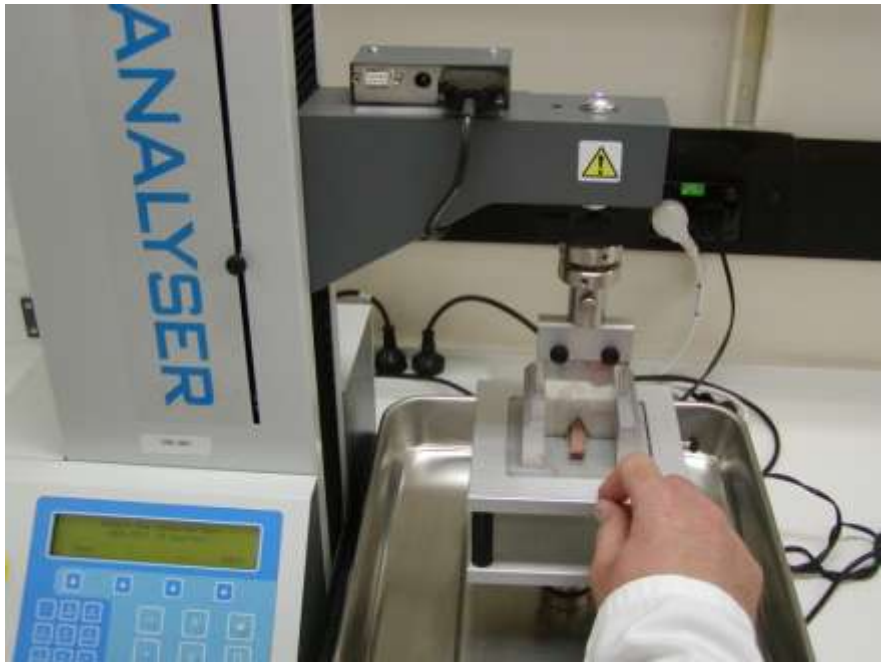
USE of VBM

- The use of VBM is limited in Australia, especially when it comes to meat quality characteristics.

Why??

- Currently no non destructive measure that can differentiate traits such as tenderness, only indicators, (i.e. pH and marble score).

- There is a lack of objective tools available for processors or adopted to measure quality traits.



Lloyd Machine used to objectively measure meat tenderness

Research

- There has been extensive research over decades in Australia and around the world into the development of online measures to predict beef carcase quality and yield characteristics

- Research into online measure technology has largely been driven by;
  - The need to satisfy consumer demand
  - Provide more accurate feedback to producers
  - Potentially reduce labour requirements at the processing level.

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What is an online measure?

- It is a technology designed to capture carcase yield and/or meat quality traits at production speed, either on the kill floor or in the chiller.

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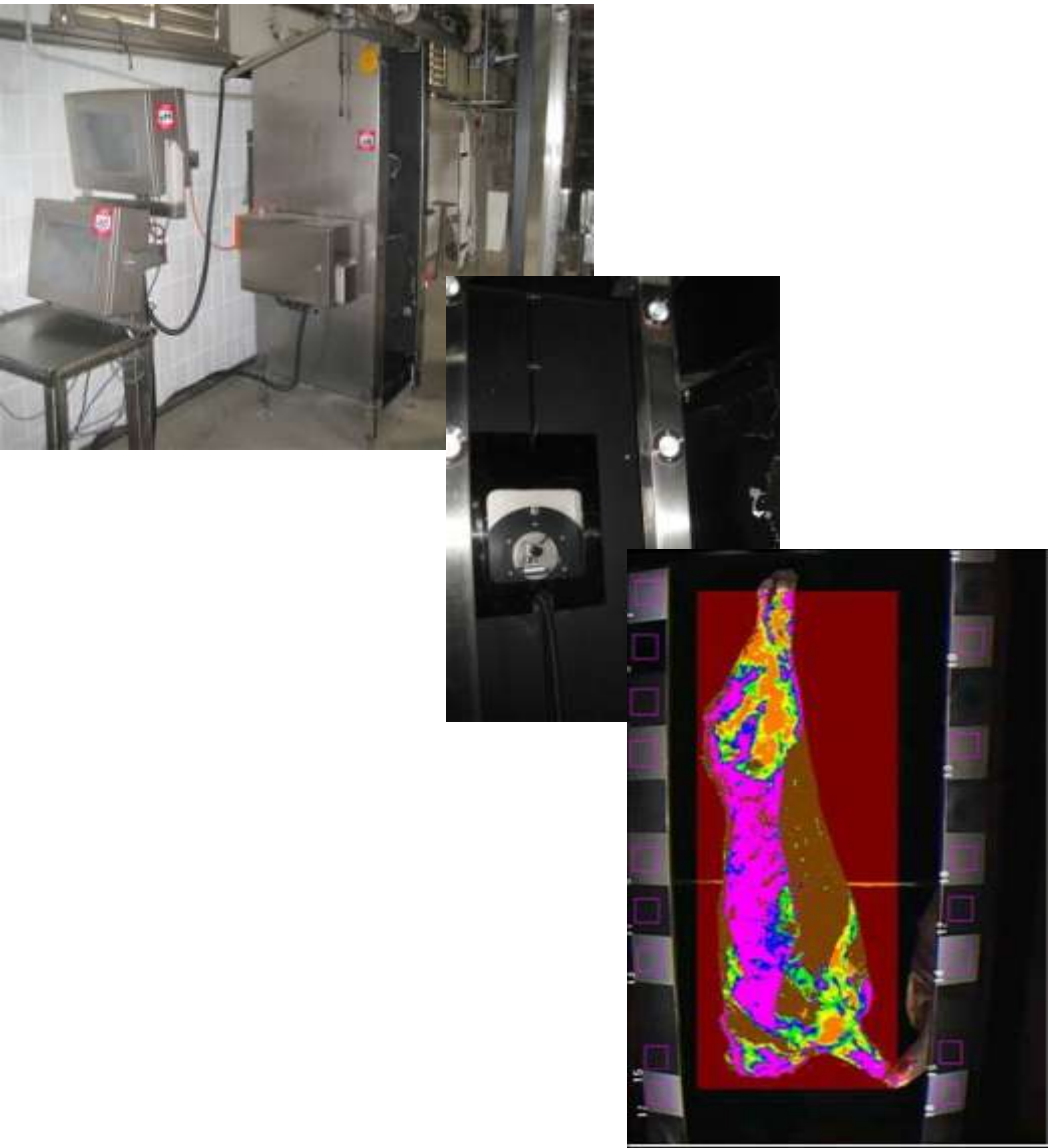
Online technologies must be…

- Fast
- Non-destructive
- Non-invasive (preferably)
- Accurate
- Cost-effective
- Ideally have multiple uses (i.e. be able to predict more then one characteristic)
- Comply with hygiene standards
- Ideal to integrate with quality programs **MSA**

Types of Online Measures

Video Image analysis – Beef Carcass



- Lean Meat Yield%
- Saleable Meat Yield %
- Fat Colour

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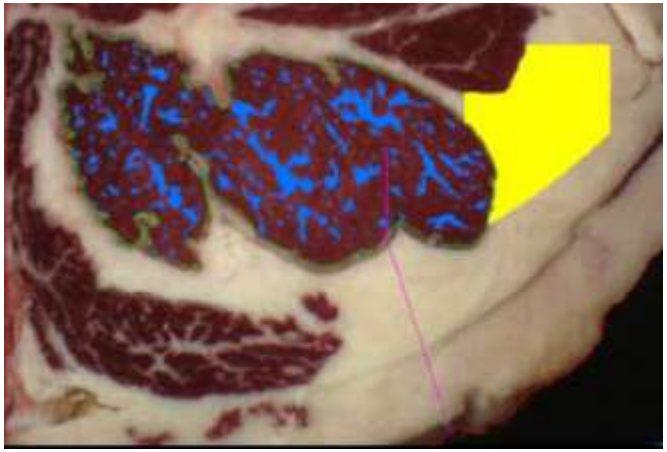
Video Image analysis – Beef Chiller



- Marbling
- Meat colour
- Fat colour
- EMA
- Rib fat depth
- Saleable Meat Yield %
- Lean Meat Yield%

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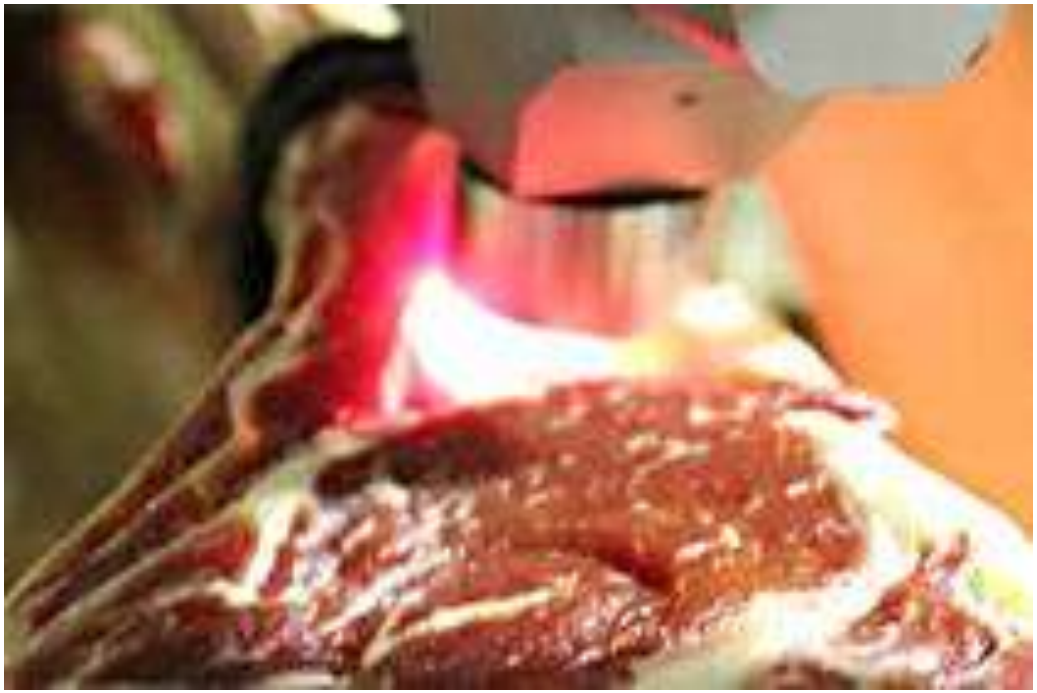
Spectroscopic methods - Hennessy Grading probe

- Fat depth P8 site
- Yield predictions
- Meat colour

Spectroscopic methods Near infrared (NIR)

- Shear force (tenderness)
- Water Holding Capacity
- pH
- Meat Colour
- Sensory traits
- Marbling



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Spectroscopic methods- Raman

- Tenderness
- Juiciness
- Cooking loss
- Fatty acids

Mechanical probes

- AUS-Meat Sheep Probe
- Measures fat depth at 12th rib

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Other Technologies

- Nuclear magnetic resonance spect… …by (NRM)

  (tenderness, pH – limited R&D in beef, e… …requires special

- …derr…

- …ute… …al

  (Fat, Muscle, Bone, IMF% CT only- no work on whole beef carcases)

Experimental

Other Current Research

- Dr Malcolm McPhee and his team at NSW DPI and UTS are investigating the use of 3D camera technology to **objectively** measure:

- Live cattle:
  - Hip height
  - Muscle score
  - P8 fat
  - Retail Beef Yield
- Carcasses:
  - Retail Beef Yield

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My Current area of work

- Objective: Is to gain an understanding of processors perspective on the value of online measures technology.

- This is been achieved through a strategic survey tailored to beef, sheep and goat abattoirs.

So what will the outcomes be???

mla MEAT & LIVESTOCK AUSTRALIA

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3 Key outcomes

1. Identify any barriers to the successful adoption of current online carcase measures available.

2. Identify any barriers to the successful adoption of future online carcase measures available.

3. Develop strategic recommendations based on information collected to increase the adoption rate of online measures.

What does this mean for producers?

- Big picture - Increase productivity and profitability

How???

- Through the increased feedback to producers on important meat quality and yield traits.

This will enable producers to….

- Make more educated decisions on breeding programs.
- Better meet market specifications.
- Gain the opportunity to implement value based marketing systems based on objective measures rather than subjective measures.
- Be rewarded for producing higher quality product.

OVERALL

- Increase the demand in beef supply through greater consumer satisfaction by better meeting consumer demands on product quality.

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Take home messages

- Online measurement technologies can be used as a tool to better meet market specifications and hence customer satisfaction.
- Producers could be rewarded more accurately for producing higher quality product.
- Development of these online technologies is ongoing, but in order for them to be successful, improved adoption strategies are required.

THANK YOU

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