

# BEEF CARCASS CLASSIFICATION AND GRADING:

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## A brief history of the current BEEF CLASSIFICATION SYSTEM

**B**eef grading and classification systems in South African (SA) have evolved over several years since 1932. Carcass conformation, fat cover, age (mostly based on the number of permanent incisors) and sex were used as criteria to describe lean yield and predict expected eating quality, although there was no evidence to either support or negate the relationship between these attributes and eating quality. Between 1932 to 1994, a grading system in different forms was used combining the criteria in different combinations.



# Quō Vādīs?

In earlier versions of the grading system, extremely large and fat carcasses were grouped as preferred grades and often produced from animals with six or more permanent incisors (>36 months old; Government Notice No. 1548 of 1936). In later developments, (Klingbiel, 1984; Government Notice No. R.1010 of 1981), lean (3 – 7 mm fat thickness), young animals (A-age animals, not more than two permanent incisors) were regarded as the preferred carcass type for the consumer.

“Grading” of carcasses terminated around 1994 but the same criteria remained to facilitate a Classification system moving to the idea of “description only” and leaving the choice to the buyer and ultimately consumers, according to their needs. Further alterations occurred until the current Classification system (not grading) implemented in 1996 after the work of Crosley et al. (1994).

In that system, carcasses with two permanent incisors were in a separate age class (AB) than those with three to six permanent incisors (B), more than six permanent incisors (C) and 0 permanent incisors (A) (Government Notice No. R.342 of 1999). Although the classification system was not intended to rank carcasses, descriptions of “Most Tender”, “Tender”, “Less Tender” and “Least Tender” were given to the four age classes, respectively, and were solely on the finding that muscles of younger animals had significantly higher muscle collagen solubility (less heat resistant during cooking) and should therefore be more tender.

The main reason for converting to carcass classification,

with emphasis on description criteria, was the deregulation of the red meat industry (and other agricultural commodities) after 1994. In a regulated market, most trading was done in urban centres where the bulk of the country’s cattle were slaughtered in large state-owned abattoirs, and visual auctioning of carcasses dominated trading. Movement of carcasses into regulated areas was prohibited. After deregulation, carcasses could be produced and sold across the country, which meant that visual auctions had to be replaced by electronic auctions requiring a description of the carcass for a remote buyer.

## **Deficiencies of the current classification system**

Despite the adoption of descriptions of expected eating quality for different age classes as noted above, the classification system was never intended for the consumer to select meat cuts based on eating-quality expected. Nevertheless, at least for high connective tissue cuts, age-related differences in eating quality would have described eating-quality fairly accurate in the early years of Classification. Coming from a regulated industry, production systems and abattoir (processing) practices were fairly uniform and standard so that other factors influencing eating quality would not play a major role. However, since deregulation, production and processing practices diversified. Factors such as genetics, nutrition, use of growth promotants, pre-slaughter handling



## Options to overcome these deficiencies

There are various grading and classifications systems used across the world. Most of them have common criteria to either describe the composition/yield of the product or the eating quality.

Although the USDA grading system attempts to rank carcasses according to expected eating quality, using mainly marbling and physiological age of the carcass, it is only the Meat

(stress), variable processing (slaughter, chilling) and post-slaughter practices (ageing, packaging, cooking) are more important than the age of the animal, in the role they played in eating quality

Due to these factors, today, the variation in eating quality of young A-age animals, for example, is quite high and it cannot be assumed that A-age beef has better eating quality than older AB and B age beef. Furthermore, the consumer has no criteria to verify the expected eating quality of generic beef on the shelf. Branded beef programs often fall short of sufficient criteria to provide guarantees for good eating quality.

Even though the classification system does not rank carcasses according to consumer preferences, price formation over the years has always shown a preference for grain-fed (predominantly A-class) beef. As a result, commercial, emerging and communal farmers opting for an ox production system based on older cattle, as against a weaner system (for the feedlots), are consistently experiencing price discrimination except when providing cattle under strict criteria to branded programs such as Free Range beef.

Standards Australia (MSA) Grading system of Australia that succeeds in considering the most critical factors to predict consumer satisfaction. Criteria such as weight in relation to fatness (growth rate), use of growth promotants, breed type (genetics), pre-slaughter stress, physiological age (ossification) muscle fat (marbling), carcass condition (fat thickness), muscle and fat colour, muscle development, muscle type, post mortem ageing, conditions under which muscle converts to meat (chilling, electrical stimulation) are combined in a grading model to collectively predict the effect of each factor and their interactions with one another on eating quality of various cuts. This system was extensively tested against consumer satisfaction in many countries in the world, including in South Africa (Thompson et al., 2010, Strydom et al., 2019).

## Changes needed to implement these options

The concept of MSA grading could be used in a local grading system across South Africa, provided that certain factors/criteria that may be unique to the South



## Benefits of implementing a voluntary grading scheme focused on consumer preferences

It is often argued that grading systems only benefit high-income consumers, by distinguishing premium quality at high prices for such consumers. However, the fact that a grading system ranks all grades of beef, consumers at any socio-economic level will have more confidence in selecting a product that meets their eating quality requirements at an affordable price (“good for everyday use” being the lowest grade). Cuts and carcasses that fail minimum criteria would be distinguished from good to best quality cuts and carcasses, allowing consumers to select following their preferences and affordability. At the moment, price and eating quality have a poor relationship.

For producers, irrespective of farming system and category, criteria, and final quality grade score (index) would dictate whether their breeding and production practices and the abattoirs processing practice warrant a higher price. Generically, it can be assumed that older cattle in good slaughter condition that arrive at the abattoir with minimum stress and slaughtered according to good slaughter practices will produce good quality grades. However, it needs to emphasise that older cattle, just like young grain-fed cattle, will not achieve high grades if they fail on other criteria.

African beef value chain tested locally. These factors/criteria include genotype composition, age at slaughter, different production systems, processing regimes and others. These will require an extensive project examining different value chain options so the necessary variation in eating quality outcomes can be adopted in a grading model that would be unique to South Africa but using internationally accredited criteria.

The cost of developing and establishing such a system locally is difficult to estimate. However, as MSA Australia has ownership of the system based on the principles and the fact that it would take many years to develop these from scratch, a substantial MSA involvement in such a project is essential. Developing a grading system from scratch is expected to be costly and will take substantially longer than consulting with MLA (Meat and Livestock Australia).

## STEPS TO IMPLEMENTATION

**G**overnment agencies responsible for legislation, together with the red meat industry and the quality assurance company, South African Meat Industry Company (legislated by the government) should collaborate to develop the proposed voluntary meat grading scheme based on meat-eating quality. The first steps would be to draft a protocol to develop such a system, identify funding sources and test the potential uptake by the industry on all levels because the success of such a voluntary system will depend on the returns on investment (cost per carcass graded vs benefits).