

BEEF PRODUCTION in the era of CLIMATE CHANGE

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It often seems that we forget that as recently as 1800 the human population was 1 billion (or actually slightly below) and it took millennia to get there. As of November 2018 the world human population was believed to be 7.7 billion, give or take a few tens of millions! That is 6.7 billion more in just over 2 centuries! What an exponential success story! But (is there not always a but?) is it not also the primary driver of climate change in our consumer-driven society?

We can feel it – in the space of a lifetime the climate in the world is changing. Temperatures are higher or lower than usual, rain is less frequent but more torrential, weather patterns are less predictable and through this all the need for sufficient food of good quality is growing. It seems to be part of human nature to look for a scapegoat and to play the blame and shame game when things change in an undesirable direction.

The livestock industry in general and the beef industry in particular have been receiving a lot of criticism in mainstream media covering the topic of climate change. Whether this dearth of information is verifiable or whether it is only supposition is no longer the issue. Once the “information” enters the public domain and the social media space supposition and unverified information is made plausible and “validated” by the number of times it has been shared. This is adding to the challenge of addressing many of the untested statements made about agriculture, livestock production and beef production that are posted and are influencing decisions and behaviours. Headlines such as “Eat less meat to save the planet” and “Beef cattle produce 10 times more GHG’s than any other livestock” tend to dominate the “news” media and the general population takes these at face value as the statements are very emotive. Climate change has

become a daily topic and everybody has an opinion. Unfortunately many of these opinions are formed by coverage in the social media and “news” spaces where often the author has heard the music but has no idea what the tune is.

To demonstrate the impact of the spread of unverified information one can look at the decrease in the per capita meat consumption in the more affluent, first-world nations, especially Europe, with a concomitant reduction in livestock numbers.

FEED THE BILLIONS

The human body needs a wide array of nutrients for growth, development, health and maintenance. While the science of human nutrition is also a vibrant field the basic building blocks are still relevant: carbohydrates, proteins, minerals and vitamins to enable the body to perform its various functions.

Beef is an important source of nutrients for the human being, containing vital nutrients such as protein, iron, zinc, magnesium, vitamins A, B12 and folate, to mention but a few. All these are essential in early growth and development of the young human body, especially the brain, and for the health and maintenance of the adult human body.

A human needs a balanced diet to reach full potential and this implies that it should not be food that is sufficient to fill the stomach to counteract the feelings of hunger only but that it should also be balanced in such a way that it provides sufficient quantities of the basic food groups or building block.

So, while a sector of the global population has the luxury of choosing what and how much they want to eat more than a billion people are going to bed hungry or malnourished impacting detrimentally on growth and development and preventing them from living their best lives. This is the challenge on the global stage.

CLOSER TO HOME - BEEF PRODUCTION

It may be necessary and useful to look at what the beef industry is all about in the context of the global scenario of greenhouse gasses (GHG), food security and sustainability.

Some actual facts are:

- Ruminants have unique anatomical adaptations to harvest, digest and convert high fibre feed into high quality food for human consumption
- Ruminants produce methane CH₄ through enteric fermentation of feed and also produce NO₂ as waste in the urine, both of which are aggressive GHG's
- Ruminants are bulk resource users, most of which is not useful to other livestock
- Currently the annual per capita intake of meat in sub-Saharan Africa is 54 kg (of which beef is but a part)
- Cattle numbers are increasing in the global south, in the less affluent and developing



economies of the world but this is often associated with system intensification requiring more supplementary feeding of the livestock

- Globally beef production is 36%; 59% and 5% from grazing, mixed and feedlot systems respectively (Global Livestock Environmental Assessment Model – GLEAM 2.0 (available at www.fao.org/gleam), 2010)
- Globally only 4.3% of the ruminant livestock ration is comprised of grains suitable for human consumption while 88.9% comes from grazing, pastures and crop residues. The balance consists of oilseed cakes and inedible by-products from grain processing
- There are reportedly 8 127 breeds of domestic livestock on earth (The Second Report on the State of the World's Animal Genetic Diversity) and of these 17% or 1 382 are beef cattle breeds
- The human population is to reach 9 billion by 2050 at current rates of population growth and the consumption of food products of animal origin will continue to grow
- In sub-Saharan Africa domestic livestock play pivotal roles in household (small scale) income, women empowerment and the supply of drought power and manure
- There is a level of competition between humans and domestic livestock for nutrients, especially between livestock-types that have the same alimentary system as humans
- Domestic animals do impact on the environment but it is not all negative

EVEN CLOSER TO HOME - SOUTH AFRICA

- In South Africa 80% of the land area is not suitable for agronomy so only for ruminants
- There are some 13.6 million cattle in South Africa (beef and dairy) and it is estimated that 5.7 million belong to the small scale sector
- The South African beef industry produces some 795 000 metric tons of beef annually
- The annual turnover of the cattle industry is R44 billion per annum
- The South African population is 55.7 million at present (StatsSA, 2017)
- Beef consumption is expected to rise by 19% from 2015 to 2026
- The beef carcass has gone from 32% fat in 1950 (slaughter of oxen at 6 to 8 years of age – fewer, heavier (>450 kg) carcasses) to 13% fat in 2018 (slaughter of predominantly feedlot-finished steers and heifers at about 13 months of age – more, lighter (± 230 kg) carcasses)
- There is growing resistance to feed additives and growth promotants
- In more affluent communities there is a shift toward organic/ grass-fed/free range
- The growth of concern for animal welfare – the general public's interaction with an animal, especially the growing urban population, is with their pets and the expectation is that farm animals should be treated as pets

WHAT CAN WE DO

We have to recognise that while a lot of the blame that is pointed in the direction of the beef industry is misplaced and/or misinformed there is no getting away from the fact that beef cattle do produce GHG's. The buzzwords when it comes to climate change are adapt and mitigate.

ADAPT

The concept of adaptation is accepting that climate change is occurring and making the best use of the production environment that comes about because of climate change – hotter, drier, less feed, etc. Put another way it can be seen to be using the best tool for the job or, another way, the animal best able to thrive in the given production circumstances.

With some 40 beef breeds in South Africa the beef producer is spoilt for choice. However, the use of breeds adapted to local production conditions, that have always been harsh but are set to become harsher, is becoming indispensable. This implies identifying the breed that will best utilise that what is available to achieve optimal performance with minimal additional inputs. In South Africa with its high summer temperatures, low and variable rainfall giving rise to predominantly seasonal, dry savannah, grasslands or scrublands it is vitally important to choose a breed that can thrive under such conditions. If one looks at indigenous African livestock breeds they tend to be smaller as they were not assisted to adapt to harsh environments. The harsh environments coerced them to be smaller so that they not only survived but also reproduced successfully under those conditions.

As livestock farming is a numbers game it is important to carry as many cows as possible that produce a healthy calf at wean annually. Having said as many cows as possible the important rider is production should still be optimal and that defines the number of animals accommodated in the system. With the change in climate, as demonstrated by the very dry decade thus far, carrying capacities are not a constant value and have to be updated and adjusted continually as the seasons unfold and livestock numbers adjusted accordingly.

The highest possible numbers is also related to the farming system but for general beef production enterprises in South Africa it is keeping a breeding herd and the selling off of the progeny, currently predominantly to the feedlot industry. The feedlot industry is very prescriptive in what they prefer to buy and they make it very clear through the prices offered for the animals made available to them for purchase. While this is their prerogative as business operators in a market where the raw material supplier is a price taker, it has also sculpted the South African beef industry. The buying requirements promoted farming with breeds suited to the very particular requirements of the feedlots without giving much thought to where the cattle are run that have to give birth to and raise the calf to weaning as affordably as possible. It has given rise to the "bigger is better" approach and many of the breeds introduced into the country are not necessarily adapted to the local challenging production environments, having originated in the temperate regions of the world. This has

led to mitigation by way of lick supplementation and supplementary feeding in some cases to ensure that the requirements of the buyers of the weaned calf can be met. This had a significant cost implication for producers as lick supplement intakes tend to be high.

Research has shown that beef cattle that are grazed at the correct stocking rate actually have a carbon sequestering effect, i.e. more carbon is bound in the system than what is released from the system thus mitigating emissions. When overgrazing occurs the opposite happens and more carbon is released contributing to GHG emissions as the pasture is degraded and not able to grow. Well managed grazing has greater biodiversity than either over- or under-grazed pastures and this is very important for sustainability. Linking back to numbers the smaller framed, adapted breeds allow for more cows to be farmed on a given area and if the stocking rate is properly managed it will still lead to carbon sequestration through proper pasture utilisation.

It is important to ensure that grazing is well managed to ensure that the animals receive the necessary nutrients that ensure optimal intake of the available fodder. If there are deficiencies this can be addressed through strategic lick supplementation. This is not to be confused with supplementary feeding as it supplements deficiencies and does not provide additional nutrients. The more efficiently the feed is used, i.e. the better it is digested, the less the gas emissions resulting from the fermentation process. Hence it is important to balance nutrients and to correct deficiencies that impact negatively on fermentation.

While each farm is unique there are lick formulations that cover the basic deficiencies very well and these should be used. What is of importance is the formulation of the lick supplement and the intake by the herd. It often happens that intakes are excessive and that can be as detrimental as no lick at all. Furthermore it is important to ensure that all animals in the herd have access to the lick. Large quantities and few lick points leave the animals lower in the hierarchy



without lick and often the dominant members of the herd overindulge with serious side effects. The safest route is many lick points with smaller quantities and regular replenishment (ideally lick supplements should be available *ad lib* and if formulated correctly intakes will be according to recommendations).

The adapted animal is able to exploit the environment to its own best advantage. The biggest part of that is the ingestion of nutrients required for production and reproduction. Other adaptation aspects include heat tolerance, good ambulatory ability to find the best feed, parasite resistance and survival instincts, eating what is available when the situation requires it.

MITIGATE

As with adaptation the concept of mitigation is accepting that climate change is occurring but to change that environment to allow the less suited animals to continue production despite the change in climate – hotter, drier, less feed, etc. Put another way it can be seen to be

using the best shed to accommodate the tool you have for the job or, another way, providing for the animal not able to thrive in the given production circumstances.

Mitigation is the alteration of the production environment to suite the animal that is going to be farmed with. In the past this was possible to a certain extent but with ever shrinking profit margins due to increased input costs and sideways moving product prices it is becoming increasingly difficult to do or maintain. A simple example of mitigation has already been given as the provision of supplementary feed.

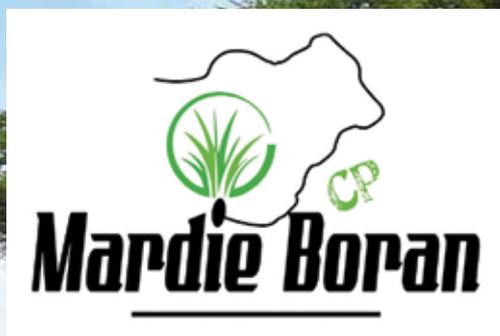
However, there is no denying the growing need for meat in South Africa and the world and it will need the intensification of systems to answer that need. Feedlots play an important role but they should not play the almost only role as is currently the case. There is room for various systems of beef production and they all have a role to play in ensuring that we as humans have access to sufficient and quality food while the environment is being

protected for use by following generations.

Farmers are used to facing challenges and climate change is another of those challenges. It is important though to allow different types of production to be practiced and the utilisation of our veld, crop residues and cultivated pastures on lands not profitable for agronomy needs to be recognised.

The right breed for the job is the motto going forward and it is foreseen that the smaller framed, indigenous African cattle are going to play an increasingly important role, not only in Africa but further afield as well.

There are indigenous African beef cattle breeds in South America, North America, Australia and even Asia. We should not let other nations benefit alone from the wonderful diversity that is the beef cattle diversity of Southern Africa.



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