

Milk Essay

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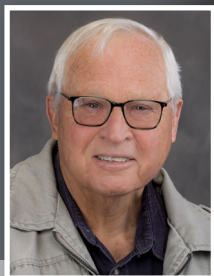


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This is a publication of Milk SA. Milk SA was founded by the primary and secondary dairy industry sectors to promote a healthy South African dairy industry.



Dr Heinz Meissner
R&D Programme Manager,
Milk SA

HIGHLIGHTS FROM THE 2022 ANNUAL REPORT

of the R&D Programme Manager,
Dr Heinz Meissner

Dr Meissner, to varying degrees, is involved with a number of projects, some of which are in the planning phase. These include further projects of the Systems Dynamic Approach on Application of the system dynamics model to estimate the relative environmental footprint of milk and milk imitations, a carbon sequestration project on Milk Production Farms; Sporidesmin toxicity (Facial Eczema) in the Eastern Cape; and the development of a new vaccine against Brucellosis.

In the **sporidesmin project**, actions were re-prioritized: What will first be done is the prevalence survey and blood and liver analysis investigation by PhD student Anthony Davis and a study of the fungus causing the toxicity, after which other initiatives will follow. To that effect, researchers of the Forestry and Agricultural Biotechnology Institute (FABI) at UP have been brought into the project.

A project proposal with the eventual aim of developing a **new vaccine against Bovine Brucellosis**, using mRNA technology, has been submitted by UP. A number of researchers, including international researchers, will

participate. The project also received support from the Red Meat Industry and the National Animal Health Forum (NAHF) and it is envisaged that a MoA will be negotiated with them, as well as joint funding due to costs anticipated. The initiative has also been discussed with DALRRD, FAO and OIE, who are positive.

Concern was expressed that so **few people in the industry are aware of what is being done in the Milk SA R&D programme** as well as the forthcoming results, and that special attention should be given to informing the industry.





Articles written for the Milk SA Website, the *Milk Essay* and *The Dairy Mail* include:

- Antibiotic transfer to agricultural soils;
- Cow performance differs from pasture to pasture;
- How to save a calf, and Making sense of the numbers: which trace mineral is best?
- The effect of nitrogen fertilization on pastures in the south-eastern seaboard;
- Tests and methodologies to support control of mastitis;
- Beneficial manure application, and What does mastitis cost the dairy farmer?
- "The global impact of cattle: A socio-economic, food security and environmental perspective" (By Meissner, Blignaut, Smith and Du Toit).

"The global impact of cattle: A socio-economic, food security and environmental perspective"

The scientific article "The global impact of cattle: A socio-economic, food security and environmental perspective" has major implications to the way we understand the role of cattle in carbon emissions and sequestration and why it would be the wrong decision to decrease global cattle numbers. It also

provides information which can help in arguments to refute the popular perspective of negative influences of cattle on global warming, biodiversity, land degradation, human health and the socio-economy.

The Project Manager was invited to convey these messages to the 2022 RuVASA Congress in May and the Congress of the Veterinary Association in September, the title of the presentation being: "Are all the arguments against livestock justifiable?"

The contents have also attracted much interest from elsewhere - Red Meat being one example - with extracts also presented to NAU in Windhoek in June, under the title: "Carbon footprint, regenerative grazing and associated aspects". The scientific equivalent of the paper with the title: "The broad-based eco-economic impact of beef and dairy production: a global review in the face of growing animosity", was submitted to the *South African Journal of Animal Science* for publication.

This initiative is considered of strategic importance, over and above the fact that it provides scientific evidence and assists the industry to formulate a position.



Buffer zones for wetlands and rivers in the dairy sector

Image source: flickr

Milk SA-funded project of INR and Confluent Environmental, led by Dr Jackie Dabrowski

Summarized by Dr Heinz Meissner

Goal: To develop best practice guidelines for improved wetland and river management on dairy farms.

Some conclusions and recommendations from the study:

1. Strategies for a specific site should be implemented, e.g. stream fencing is most effective when implemented along headwater streams and as a result, is a more suitable option for farmers in the headwater catchment.
2. Similarly, the benefits of riparian buffers are most tangible when continuous strips of unbroken buffers are implemented. Therefore, it is advised that landowners within a catchment work together to form coordinated management plans for the catchment.
3. Since sustainable dairy farming is an essential requirement to ensure that receiving freshwater systems are protected from harmful dairy farm

wastewater, trade-offs have to be made between dairy production and the associated environmental impact. The challenge is that environmental and economic goals often conflict, and a middle ground must be found to achieve a level of balance on dairy farms.

4. To conserve scarce water resources, rehabilitation of degraded wetlands may be the best option.
5. Also, the potential benefits of constructed wetlands should be investigated as the long-term benefits will outweigh the loss in grazing land and construction costs. The challenge is that these treatment options usually require portions or sections of land to be fenced off from cows to protect the system, as well as the health of the herd. Farmers who operate pasture-based farms may be reluctant to utilise such technologies as they will result in a loss of grazing land. In cases where farmers can implement these technologies, it is advised that they be used in conjunction with mitigation measures to ensure that their land is managed optimally and that the wastewater treatment practices are protected.



Probiotic level in yoghurt adequate to potentially counter *Listeria* and *Candida* infections

Milk SA-funded project of Project leader Prof Elna Buys of the University of Pretoria
A summary by Dr Heinz Meissner

Goal: To develop an acceptable synbiotic (pre- and probiotic) yoghurt product containing selected probiotic strains with the potential to prevent candidiasis, listeriosis and diarrhoea.

Bacterium of choice: Viability of *Bifidobacterium* spp. is the main outstanding issue in the yoghurt experiments, and therefore the focus in 2022 was on the optimisation of *Bifidobacterium* spp., viability through improved process parameters and operations.

Two additional *Bifidobacterium* spp., (*B. animalis* subspp *animalis* and *B. breve*) were included together with *B. bifidum*. The optimisation results showed that the viability of *Bifidobacterium* spp in yoghurt is

species-dependent, as the species tested showed different tolerances to oxidative and acid stress. Among the three species tested, *B. animalis* subspp *animalis* exhibited better tolerance to oxidative and acid stress and survived in yoghurt at levels >107 CFU/g throughout a 28-day storage period, whereas the viability of *B. bifidum* and *B. breve* progressively declined during the storage period. These findings were complemented by the pre-adaptation experiments which showed that *B. animalis* subspp *animalis* retained a higher viability under oxidative challenge.

Experiments to test the survival of selected variants of *Bifidobacterium* spp in yoghurt are ongoing, amongst others where ascorbic acid proved effective as antioxidant. At this stage though, due to its intrinsic survival ability, *B. animalis* subspp *animalis* appears to be the suitable organism for use in probiotic yoghurt production to attain the goal. The efficacy of the probiotic is not improved by adding a prebiotic such as inulin, and therefore the quest to develop a synbiotic yoghurt is no longer pursued.

Next phase: Testing in human subject digestive tracts to establish the efficacy of the probiotic in preventing the colonisation of *Listeria monocytogenes* and *Candida albicans* will commence in 2023.





Milk SA Programme Manager attends important workshop arranged by the National Animal Health Forum and the Technology Innovation Agency

A workshop hosted by NAHF & TIA held at the River Meadow Manor, Centurion on 30 January 2023, was attended by Dr Mark Chimes, Milk SA's Scientific representative on NAHF. He is also Milk SA's Programme Manager on Animal Health & Welfare. He reported as follows:

The purpose of this workshop was to identify the four main problems, from a long list of potential problems, that are faced in the animal health sector. Ideally we would focus on these four problem areas as a start, to improve animal health. The four areas identified were:

1. PPP (Public Private Participation)

A PPP needs to be established that can focus on the areas that require urgent attention. This PPP needs to be self-funding. The initial step would be to do a GAP-analysis and set up Terms of Reference. This PPP will be set up by NAHF, TIA, DALRRD and ARC. The purpose of the PPP would be to drive and coordinate the efforts of the private and public sectors to achieve the goals listed under points 2 to 4 below.

2. Vaccine production

This has been identified as the area with the highest immediate impact on animal health and welfare, as well as financial and production implications for producers and farmers. The focus would be on doing a risk assessment to determine which diseases pose the most danger to the national herd. The next step would be to identify which vaccines are available / not available and to identify the greatest need. The general consensus was that we need to move away from the state having a monopoly on the vaccine market through OBP. There should be more collaboration between the state and private sector to coordinate the research and development on the most important diseases and vaccines.





3. Research and Development Commercialisation and Infrastructure

The general feeling was that there is a wealth of epidemiological data available but that it is fragmented into pockets of data in the state and various research institutions. Ideally, there should be a system where all the epidemiological data is collated and made available to anyone doing research on a new drug or vaccine. The areas where there are gaps in the data should be identified and research focussed in these areas. R&D needs to be prioritised on the most pressing disease areas. We urgently need infrastructure, such as a national BSL3 facility that can be “rented” to conduct research on high risk diseases such as Foot and Mouth and Rift Valley Fever.

4. Regulatory – Section 20 and Act 36

Here the consensus was that it takes far too long to get new drugs and vaccines registered once all the data has been handed to the drug regulator. The process needs to be sped up. There are treatments and vaccines for several problem diseases that are ready and have been lying with the regulator for up to 4 years, awaiting approval. There is also a lack of expertise to evaluate certain new technologies, as well as inconsistencies in terms of how new treatments are evaluated and approved. This group would like to assist in compiling standard guidelines on how new treatments are assessed as well as help to establish panels of experts to assist in assessing new technologies.

Hopefully with the collaboration between NAHF and TIA, these processes will now be implemented with urgency.





187th meeting of the Livestock Welfare Coordinating Committee (LWCC)

attended by Dr Mark Chimes

Dr Chimes reported as follows to Milk SA, on the above meeting held on 17 February 2023:

I attended the LWCC meeting online on 17 February 2023, primarily to present my proposal for the amendment of SANS 1694:2018 - The Welfare of Dairy Cattle, with regard to the transport of bobby calves. The proposed changes were generally accepted as reasonable and I was advised to present this to SABS for consideration when the standards are reviewed.

I was asked to join hands with Mr Fanie Ferreira of MPO and Dr Gerhard Neethling of the Abattoir Association to make recommendations to SABS, since there are other issues

within the standards that also needed to be reviewed.

Other issues that were discussed include:

1. The vaccine shortage was brought up again since this is now becoming a welfare issue.
2. Guidelines for electro-ejaculation in bulls has been finalised.
3. Experts are busy compiling regulations / guidelines for livestock transport by sea for slaughter.
4. A guideline for assessing animals injured in veld fires, is being compiled so that veterinarians and farmers can prioritise treatment and prognosis based on the level of the animals' injuries.



Shortage of critical and strategic vaccines high on the agenda

A joint press release between NAHF and DALRRD was issued on 19 January 2023 after a meeting between the two parties. This meeting followed previous engagements in 2022 with the Honourable Minister and the Director-General. It was stated by the industry that there are current shortages of critical and strategic vaccines, that herd immunity has already been compromised and that action needs to be taken immediately. The parties agreed that sufficient quantities of vaccines had not been available and on time. This is an escalating problem. According to the press release, DALRRD and NAHF reached consensus on the following:

- Private sector collaboration and involvement;
- Review of legislative requirements in order to accommodate private sector involvement;
- Urgent discussion between DALRRD and OBP; and a
- Follow-up meeting to be held between DALRRD and NAHF.

However, it seems that information from Onderstepoort Biological Products SOC is not always consistent and that OBP also reports vaguely on the availability of products, while promises of an “equipment maintenance and repairs programme” are made.

NAHF, of which Milk SA is a member, continues to put pressure on OBP. The latter has indicated that the private sector may produce vaccines through the processes prescribed by

Act 36 of 1947. However, NAHF told OBP that solutions were needed within weeks - and not months or years - and that too much red tape was involved. While OBP calmed NAHF saying that there was no need for panic, Mr Gerhard Schutte (NAHF Chair) placed on record that we are heading for a national crisis. In a workshop facilitated between the Technology Innovation Agency (TIA) and NAHF on 30 January 2023, there was consensus that the crisis was real. Dr Mark Chimes (Milk SA Programme Manager: Animal Health & Welfare) attended the last-mentioned workshop on animal diseases.





Front-of-pack labelling and the draft regulations relating to the labelling of foodstuffs

**By Jompie Burger -
Milk SA Project Manager:
Dairy Regulations and Standards**

The Department of Health (DoH) completed the draft Regulations relating to the Labelling of Foodstuffs and upon query, DoH responded that it had consulted with its Legal Unit and had to engage the Department of Monitoring and Evaluation (DME) to finalize the socio-economic impact system (SEIAS), as SEIAS had raised several comments and issues which needed to be dealt with.

DoH however responded to all concerns and is awaiting the SEIAS certificate before it can

publish the draft regulations. It is expected that the draft will be published early in 2023.

The collaboration by the Regulations and Standards Project and Consumer Education Project of Milk SA continued in preparation of the draft through the Milk SA Task Team, which aims to strengthen the position of the dairy industry, with specific reference to the unique nutritional composition of dairy.

The Milk SA Task Team is supported by a team of experts to formulate a scientific document that is evidence based to preserve the nutritional value of dairy, while considering labelling systems that could be detrimental to the image of dairy in respect of sugar, fat and salt.





MEETING HELD WITH DALRRD ON QUALITY INSPECTION SERVICES

Milk SA takes further action against DALRRD who fails to execute the Agricultural Product Standards Act

The failure by the Executive Officer of the Agricultural Product Standards Act (APS) to take appropriate legal action against the misuse of the name “plant butter” as well as allowing the contravention to continue in terms of section 6 of the APS, resulted in further action by Milk SA.

This action includes the right of Milk SA to proceed with legal action against DALLRD’s Executive Officer. The response of the latter was noted and follow-up action is currently being considered due to failure by the EO to uphold commitments.



By Jompie Burger
*Milk SA Project Manager: Dairy
Regulations and Standards*

The revocation notice regarding the appointment of Nejahmogul Technologies as published in the Government Gazette, was previously circulated to industry. A formal meeting was held between the Project Manager and DALLRD’s Directorates: Food Safety and Quality Assurance, the Directorate: Inspection Services and the office of the Executive Officer.

The meeting was meaningful in the sense that proper communication channels were established through which DSA will communicate test results to designated persons in the Directorate Inspection Services, to render inspection services where remedial action on non-conformances in terms of the Act and regulations are required.

SA National Committee of the International Dairy Federation (SANCIDF) held an inspirational AGM



At its AGM on 27 March 2023, SANCIDF President Melt Loubser, said in his report that the International Dairy Federation (IDF) is the only organisation that can obtain global consensus on all aspects of dairying, and represent the global dairy sector towards intergovernmental organisations such as FAO, Codex, the World Organisation for Animal Health (WOAH, founded as OIE) and WHO.



Melt Loubser

He emphasized that IDF is the key authority on dairy standards and has access to a vast network of worldwide experts in dairy. IDF has four focus areas namely Sustainability, Nutrition, Food Safety and Standards. These focus areas span 10 work areas, 17 Standing Committees and six Task Forces.

Through SANCIDF, the SA dairy industry is an active, fully-paid Member of IDF and thereby gets the opportunity to meet and exchange ideas with fellow specialists in other countries - an invaluable resource when confronted with new problems requiring solutions.

An organisation in a deregulated market environment, SANCIDF plays a meaningful role in the transition of other dairy industries in their efforts to become more market orientated in their approach.

The work of SANCIDF is positioned to various projects of Milk SA to ensure alignment where possible with the functions of IDF. SANCIDF also participates in the various projects of Milk SA to ensure coordination where practicable, with the functions of IDF.

Primary Members of the various Standing Committees (SCs) reported on their activities of work during 2022. While the AGM commended the excellent reports, there was also excitement about new members who had joined as Primary members of various Standing Committees, who are highly qualified and notably passionate about the dairy industry. These members are also SA representatives on the IDF Standing Committees.

SA's primary members on the various bodies of IDF are currently as follows:





End of a chapter for Helene Pheiffer...

SC on Analytical Methods for Additives and Contaminants	Jompie Burger
SC on Analytical Methods for Composition	Riaan Lombard
SC on Analytical Methods for Dairy Microorganisms	Prof Elna Buys
SC on Animal Health and Welfare	Dr Mark Chimes
SC on Dairy Policies and Economics	Alwyn Kraamwinkel
SC on Dairy Science and Technology	Anneke van Niekerk
SC on Food Additives	Anneke van Niekerk
SC on Environment	Dr Colin Ohlhoff
SC on Marketing	Christine Leighton
SC on Nutrition and Health	Maretha Vermaak
SC on Standards of Identity and Labelling	Jompie Burger
SC on Residues and Chemical Contaminants	Vacant
SC on Farm Management	Fanie Ferreira
SC on Harmonisation of Microbiological Methods	Prof Elna Buys
SC on Microbiological Hygiene	Jompie Burger
SC on Statistics and Automation	Vacant

Helene wishes to share the following message with Milk SA and the dairy industry, as she has decided to continue her career in the red meat industry:

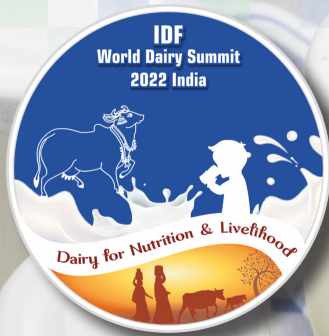
"After 14 fulfilling years as staff member of the MPO, Manager of the MPO Training Institute (Institute for Dairy Technology) and Project Manager of Milk SA Primary Skills and Knowledge Development, I have accepted a new opportunity to manage transformation in the red meat primary cluster.

I am grateful for the experiences and opportunities that I have had in the dairy industry and want to express my gratitude to my colleagues and friends at Milk SA for their support and guidance.

I wish Milk SA and the dairy industry all the very best for the future. May it continue to grow and prosper for many years to come."

Milk SA wishes to thank Helene indeed for a solid foundation laid in the primary skills & knowledge dispensation, the huge amount and excellent quality of work, and the positive impact that she has made on behalf of the producers and the dairy industry at large. Our best wishes accompany her.





Key takeaways from SA Delegates who participated in the World Dairy Summit in India

South Africa's dairy industry is a full member of the International Dairy Federation (IDF), through the SA National Committee of IDF. South Africa is also a full member of the International Milk Promotion (IMP) group of IDF, which specialises in marketing and advertising.

Milk South Africa's projects and activities are aligned with those of the International Dairy Federation. The South African dairy industry is well represented on most of the IDF Standing Committees and through its Primary Members of the local Standing Committees, the SA National Committee actively contributes to IDF's work programmes.

Milk South Africa and the SA National Committee of IDF recently published a combined report of the attendees to the 2022 World Dairy Summit and the IDF business meetings which were held in Delhi, India. The full report is available from the Milk SA website.

Here are a few take-away observations from our South African colleagues who attended the Summit:



CHRISTINE LEIGHTON

The Task Force on Plant-Based Beverages, established by the Standing Committee on Marketing, developed a communication plan in respect of plant-based beverages.

Further work involves understanding differences between dairy products (milk, cheese, yoghurt, cream and butter) and plant-based products offered as alternatives. Laboratory-produced products will be addressed in a further phase.

As climate change is a serious matter for younger generations,



much of the International Milk Promotion Group's work focuses on Generation Z.

A presentation by Melissa Cameron (Human Health and Nutrition Policy Manager at Dairy Australia) conveyed the following and many more interesting facts:

- Overall, consumers like simplified labels and front of pack sign-posting that indicate the healthiness of the product.
- Consumers have limited time and find it difficult to interpret various nutrients and ingredients of the product.

- Nutrition information can make the consumer feel coerced or pushed to make decisions, which creates consumer resistance.
- Front-of-pack labelling is having no real impact on purchase behaviours.

From the Global Marketing Trends presentation, FAO and OECD (Organisation for Economic Cooperation and Development) believe that dairy products will have the largest rate of consumption growth among all food categories over the next decade.

DR MARK CHIMES

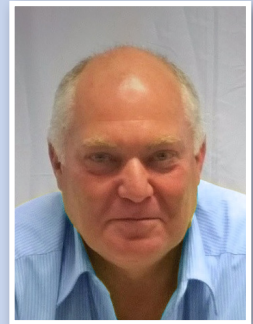
Animals in India generally feed on crop residues and therefore, milk production is low. Their government is providing agricultural support through nutritional and husbandry advice, as well as veterinary services.

In addition, they have inseminators that travel to the villages to inseminate cows on heat, to improve the genetics of the national herd. Sexed semen is used a great deal, since bull calves have very little value.

The Hindu religion prohibits the slaughter of cattle. As a result, bull calves are frequently "set free" after weaning and roam the countryside and roadways. The government has started to round up these animals and keep them in "cow shelters", where they will live until they die of old age. This is obviously a costly affair. By contrast, buffalo are not considered holy and may be slaughtered. As a result, one does not see buffalo roaming the streets and countryside.

Trials are underway to test various crops to determine which grow best in the Indian climate and to improve milk production.

India is also focusing on reducing the carbon footprint of the dairy sector. The best way to do this is by improving nutrition and genetics of the dairy cows. In the USA dairy sector it was shown that in 1944, 25,6 million cows produced 14 billion gallons of milk. Currently 9,2 million cows are producing 22 billion gallons of milk. Through better efficiencies achieved by improved genetics and nutrition, the USA dairy farmers have reduced their carbon footprint by 41%. Compared to 1944, modern milk production in the USA requires 21% of the animals, 23% of the feed, 35% of the water and 10% of the land to produce the same one billion kilograms of milk.





From the IDF business meetings:

Dr Stephan Peters from the Netherlands introduced the topic of the dairy matrix and explained how the health effects of foods go beyond their nutrients and that foods have health effects that are not always attributable to their composition, for example saturated fat and salt in cheese versus the scientific literature known on cheese and health.

Dr Peters highlighted the importance of looking at the effects of whole foods on non-communicable diseases and assisting experts who write Food-Based Dairy Guidelines and Food Policies to understand the concept of the food matrix.

IDF developed a school milk knowledge hub which the Action Team is responsible for keeping up-to-date. This work is ongoing and is supported by the IDF head office as a priority item.

From the WDS sessions:

Ms Arlene Mitchell, Executive Director of the Global Child Nutrition Foundation (GCNF) stated current scenarios that influence nutrition security and mentioned that there was a dramatic worsening of world hunger in 2020.

This was likely to be related to the fallout of COVID-19. A multi-agency report estimated that around a tenth of the global population (up to 811 million people) were undernourished during 2020.

According to the World Bank's Commodity Markets Outlook report in April 2022, the war in Ukraine has altered global patterns of trade, production, and consumption of commodities in ways that will keep prices at historically high levels through to the end of 2024, exacerbating food insecurity and inflation.

Diets worldwide are far from being healthy and have not improved over the last decade. The following points were highlighted by Ms Mitchell:

- Fruit and vegetable intake is ~50% below the recommended five servings/day that is considered healthy.
- Legume and nut intakes are over two-thirds below the recommended two servings/day.
- Red and processed meat intake is rising and at more or less five times the maximum level of one serving/week.
- Consumption of sugary drinks (not recommended in any amount) is also increasing. No region meets recommendations for healthy diets.
- Low-income countries still have the lowest intakes of key health-promoting foods (fruits and vegetables) and the highest levels of underweight.
- High-income countries have the highest intakes of foods with high health and environmental impacts, including red meat, processed meat and dairy, and the highest levels of overweight and obesity.



IDF Standing Committee on Standards of Identity and Labelling

During the roundtable discussions on Front-of-Pack

Nutritional Labelling (FOPNL) and national regulatory developments and emerging issues, the South African situation was reported on, particularly that FOPNL is contentious due to a lack of consensus on user-friendly labelling.

The prediction was noted that South Africa was likely to end up with a warning label system. The endeavours were shared on how Milk SA had set up a specific team of nutritionists in South Africa to encourage the government to revisit their approach towards warning labels on dairy.

Also, the importance of animal welfare was shared and that a Milk SA task team under the Sustainability Committee had been established to assess the way forward on animal welfare labelling; and that Milk SA is currently revisiting compositional standards and misuse of labelling in the market, relating amongst others to dairy alternatives.

Further noted, was the South African work on compositional standards, that current regulations are challenging because of not being fully aligned with the General Standard for Use of Dairy Terms (GSUDT) and a 30-year precedent of using the term “milk” if it is qualified by the plant source. The notion for support for position papers on animal welfare,

environmental management, and CO₂ emissions, particularly guideline information to inform national positioning, was noted.

IDF Standing Committee on Animal Health and Welfare

In respect of the programme of work, attention was given to the following:

Reproductive technologies for dairy cattle: Fact sheets have been produced on Artificial Insemination, Embryo Transfer, Reproductive Hormones, and Genomic Selection. Fact sheets under review include sexed semen and gene editing.

Factsheet on Management of calves from birth to weaning: The Action Team had a number of webinars on topics related to calf rearing which were very well attended and very well received. The first Factsheet on keeping calves in pairs was in the process of development at the time of the SC meeting.

New work items: Guidelines for novel approach to manage milk quality on farm: This initiative will help with the different protocols that exist worldwide, as a guideline on how to conduct better troubleshooting and how to support dairy farmers more constructively. It would also help to prioritise and interpret the findings, during support to dairy farmers. The approach is inspired by the work with the sensor-based mastitis management and now, the metabolic disease management. South Africa is a member of the Action Team and has already presented all relevant guideline documentation published by the Dairy Standard Agency (DSA).

Laboratory-produced proteins such as beta-lactoglobulin: The SC DST discussed the topic of laboratory-produced proteins similar or equal to dairy proteins several times. A first internal IDF board guidance on the topic exists, dated 25 June 2021. At the Global Dairy Conference in Copenhagen in October 2021, two presentations on laboratory-produced dairy-like proteins were given. Significant investment is going into the sector. Often the technology is called “precision fermentation”. IDF places importance on the use of dairy terms in accordance with Codex Alimentarius, that milk is mammal milk and dairy products made from natural mammal milk. Laboratory-produced proteins similar or identical to dairy proteins use known technology, for example for insulin or recombinant rennet production. For direct food production, this technology is new. Genetically-engineered microorganisms are used, with trans-gens from the bovine genome inserted into the genome of microorganisms (bacteria, yeast, mould), in

order to produce the desired single protein or other milk constituent.

From the sessions and in general

The resilience of the Indian dairy industry and government to drive a unique system of milk production by millions of small-scale farmers and convert raw milk into a variety of dairy products, is certainly highly unique. The support of the Indian government to make the system work is definitely key in the process of understanding the principle of how to support individual households to generate income and create a dispensation where good nutrition reaches a vast part of Indian households. It is however questionable how such a system will remain sustainable within a fast-growing nation and how sustainable development goals will be reached. One of the concerns noted was the levels of chemical residue (antibiotics) in milk destined for human consumption.



DR NDUMISO MAZIBUKO

IDF Joint Steering Committee on Dairy Policies and Economics and Steering Committee on Marketing

- As from July 2022, India had banned single-use plastic and had moved to a more reusable approach; and Ireland planned to reduce carbon with 25% by 2030.
- The Republic of Korea is looking at the purification of water used after milking and the UK and USA are in the process of - and planning - to reach carbon neutrality by 2050. It emerged further that climate labelling was part of the farm-to-fork exercise.
- It was noted that the demand for food would be impacted, as consumers' disposable income had been affected because of food inflation in a number of countries. This was an indication that in other countries, dairy prices were on the rise - fuelled by soaring inputs costs. It was highlighted that from work

conducted, plant-based dairy products have been growing rapidly. However, this was from a very low base.

- It was stated that cheese had registered the highest per capita growth; that this was mainly in Asia; and that the growth in terms of plant-based dairy products, was mostly dynamic globally. Indonesia and India were forecasted to be the most dynamic, in terms of dairy products.

Opening session of the Summit

Over the past eight years, milk production in India had grown by more than 40%, with an average growth of 6% per year. It was stated that India had a National Dairy Development Plan and that dairy production is very important to the rural economies of India. The Prime Minister mentioned that milk production had over the years, been part of India's tradition. In India, milk production is done by the masses - by farmers with between one and three animals. It was noted that payment for unprocessed milk deliveries goes directly to the farmer through a digital payment system. There was an indication that the government and the private sector are working together on a collective approach to sustainable food systems.

Session: World Dairy Outlook 2022

Milk production from cows grew by 1,6% in 2020/21 and the Compound Annual Growth Rate by 2% (2010/21). In terms of buffalo milk, production grew by 5.2% in 2020/21 and the Compound Annual Growth Rate by 4.2%.

The per capita consumption of dairy increased by 1,4% between 2020 and 2021 and the Compound Annual Growth Rate increased by 1,1% between 2010 and 2021.

The below-average 2.1% growth of global milk reflected the difficult supply situation especially in the key exporting regions, caused by the sharply increased costs of energy, animal feed and fertiliser. The two underlying growth engines remained quite consistent over the past few years, namely production in the milk-deficient regions and buffalo milk production.

Dairy trade is slowing down because of inflation and sluggish economic growth. It is also important to note that there is great uncertainty regarding the long-term impacts of inflation and geopolitical issues.

Session: Evolution of Dairying – A livelihood perspective

It was noted that dairy impacts the livelihood of approximately one billion people globally. There are approximately 121 million farms and it was indicated that globally, there are three major dairy farm types:

- Small farms (household perspectives): These have one to nine cows, dairy is one income source, 50% of the milk is consumed on the farm, and 50% is sold;
- Medium-sized farms (family labour perspective): Work is mainly done by the family, the size in developed countries is 10 up to 100 (can go up to 300); and
- Larger farms (business perspective): Work is done mainly by employees, the size in developed countries is > 100 cows or more and the expected ROI is generated.

It was also indicated that since July 2021, there had been no growth in the world's milk supply - if we exclude India and Pakistan - and that Competitive farming systems are key globally, in any agricultural sector.



Observations and Important Themes from the Business Meetings

From a marketing perspective, it was evident that an ongoing challenge for the sector is our ability to deal with younger consumers (Generation Z and future Generation A) and how these age groups still associate with negative sentiments around 'dairy'. More focus shall be placed on the establishment of a communication framework which will connect to the 'environment' topic. The aim is to develop a central approach which can be applied to most countries, with marketers then being appropriately equipped to communicate the positive environmental impacts of dairy to the consumer.

Although environmental references are being increasingly used by nutritionists in their communication, it was agreed that this is mostly done selectively and that it would be beneficial to have environmental experts available to scrutinize information, before being communicated in the public domain. A relevant statement was that the sector should not only focus on the environment, but rather on 'sustainability as a collective' which encompasses so much more. To this extent, an action team will be established with representatives from SC Marketing, SC Environment as well as SC Nutrition and Health.

The nutritional value of dairy remains a key subject area with much effort being directed towards establishing a nutritional indicator which could be accepted among the scientific community. This originates from the limitation that Life Cycle Assessments (LCAs) typically express results on a 'per kilogram' basis which is not always practical from a nutrition perspective. The notion is that a functional unit, rather than an indicator, would perhaps be a better way to represent environmental criteria in a dietary context. The development of a nutritional LCA (N-LCA) is therefore exciting work which will challenge systems' thinking and require a multi-disciplinary collaboration within the dairy sector.

Observations and Important Themes from the Conference Sessions

The dairy sector in India is showing resilient growth at 6% versus the world average of 2%, while it is contributing approximately 23% of global milk production. Women play a crucial role in the Indian dairy sector, representing roughly 70% of the workforce while being credited as the driving force behind dairy development in the country, with their active participation stimulating well-being and economic independence.

The author noted numerous limitations linked to the Indian model including the availability of fodder to stimulate and improve feed conversion efficiencies, challenges around livestock welfare and veterinary access. Cold chain and product safety concerns, as well as a significantly higher emissions footprint per kilogram of milk produced, were raised.

This contrasts strongly with typical high production farming systems where emphasis is instead placed on factors such as developing the genetic potential of cows, having high quality feed available, placing attention on calf and heifer rearing and cow comfort, amongst others.

As was referenced in the Standing Committee meetings, the role of dairy in nutritional security and the progression of sustainable food systems shall remain a core focus area for the sector. Threats from marketing campaigns around the world, are negatively positioning nutritious foods which can result in lost ground in what was referred to as the 'consumer desirability war'. To make progress, it is

essential that Governments prioritise healthy diets through national dialogues, while consumer preferences could be shifted through strategic campaigns which tap into human aspirations.

Nutrition metrics are increasingly necessary when assessing environmental impact although some work is still required to scientifically validate appropriate functional units. While essential nutrients can be obtained from a variety of sources, including milk alternatives, nutrient bioavailability should also be placed into context. This is where the concept of the 'dairy matrix' and the role between dairy and health becomes extremely important.



FANIE FERREIRA

Some of the factors which stood out in terms of what I am accustomed to and aware of, were the following:

- The number of dairy farmers is about 50 million.
- The average herd size is two cows per farmer.
- The average production per farmer is six litres per farmer per day.
- Total milk production of India is 300 million litres per day.
- Indian production has been growing strongly over the last decade.
- India's aim is for production to grow at a

constant rate of 5% per annum.

The conclusion can thus be made that in most cases, milking on a small scale is still financially sustainable in India. During the discussions, there was a remark that Austria's average herd size consisted of only eight cows and that they could survive. The success of the small farmer in India is influenced by market access, area of production and the availability of natural pasture, as well as the costs of production.

We visited *Mother Dairies*, a large processing plant near Delhi. A million litres of milk is processed there per day. Approximately 800 000 litres of the milk is pasteurised and standardised daily at 3% fat and sold in vending machines. The machines work with a token, which can be purchased and then used in the machines. One token provides 500 ml of milk. Since the consumer provides his / her own container, no packaging costs are applicable.

The average butterfat of milk produced in India is 6.5%. This is as a result of the large percentage of water buffalo that are milked. According to one of the management members at *Mother Dairies*, they pay the farmer R10 per litre for milk with a 6.5% butterfat content and the milk is then standardised at 3% butterfat. The standardised milk is then sold to the public at almost R5 per litre. According to the official, this is economically possible as high-value products are manufactured from the remaining 3.5% fat.

The manufacturer in Delhi is also known for his yoghurt and ice cream products. Because of their production system, fresh milk's shelf life is considerably shorter than what are we

are accustomed to. It is impressive how good their infrastructure is when one takes into account that the average farmer produces only six litres per day and the processor handles one million litres per day.

We also visited a milk collection point of one of the large processors outside Agra. It was interesting to see how milk literally arrived there per litre in buckets and cans, on bicycles



Photos, clockwise from left below:

- Women waiting to have their milk production weighed and analyzed
- TV interview with Dr Mark Chimes at the IDF World Dairy Summit
- Front: Dr. Mark Chimes, Dr. Ndumiso Mazibuko, Maretha Vermaak; Back: Dr Colin Ohlhoff, Rainer Bertsch (Germany), and Mrs Bertsch
- Interview with Jompie Burger

and motor cycles. The milk is then analysed in a very well equipped reception area. Butterfat and proteins are determined within seconds by highly-specialised equipment and a price for the amount of milk delivered appears on a screen, together with the producer's delivery number. Following this, the milk is cooled in a mass cooling tank.

In addition, we visited a larger producer who adds value by processing his cows' waste matter, namely cow manure and urine. The urine is used as additives in traditional medication and cosmetics, while the cow manure is processed into ornaments which are sold to tourists. Little waste matter is therefore lost and an extra income is generated from this.

A hearty welcome to Ronald Rapholo!



As we sadly took leave of Helene Pheiffer, we are happy at the same time to welcome Ronald Rapholo in Helene's place. We requested Ronald to introduce himself to the industry.

"I am thrilled to be joining the organised dairy industry as the new Manager of the MPO Training Institute as well as project manager for Milk SA.

I was born and raised in Botlokwa, Limpopo, and after matriculating from Ramapo High School in 2002, I pursued my passion for animal science and studied at the Tshwane University of Technology, where I obtained my B Tech in 2006.

My dairy career began at Malleson Brothers dairy farm, where I was responsible for milking over 800 cows. After gaining valuable experience at Mallesons Brothers, I moved on to work at Homsek Dairies as a farm manager and later at Nkunzi Milkway (later became Clover Milkyway) as a farm support manager. These experiences have given me a deep understanding of the dairy industry and the

skills necessary to manage farms and teams effectively.

In 2020, I decided to broaden my horizons and gained experience in BEE implementation policies and human resources at an international company. During this time, I furthered my studies in Labour Law, which has provided me with a unique perspective on managing people and resources.

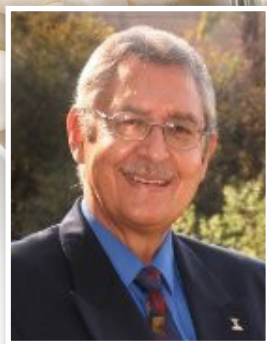
As the new Manager of the MPO Training Institute, I am excited to bring my extensive experience to the table and implement new objectives and ideas to improve the industry. When I am not working, I am a family man who enjoy spending time with loved ones. I also like listening to music, particularly soul and R&B, and watching soccer in my spare time.

I look forward to working with everyone to create a brighter future for the dairy industry. Thank you for your warm welcome."

Welcome aboard our dairy ship, Ronald and enjoy the journey!



Prof Piet Jooste lays down the reins



In January 2023, Prof Piet Jooste sadly resigned from the Dairy Research and Development Committee (DRDC) after also resigning from the other structures of the organised dairy industry, due to ill health. In his letter to DRDC, he thanked everyone for the privilege of being able to serve on the Committee and to interact with everyone, for whom he had the highest regard. He also mentioned that he was happy to see younger scientists entering the arena, who would be able to fill any gap owing to his resignation.

Prof Jooste, Doctor of Philosophy (PhD) - Food Microbiology - started as a researcher with the Animal and Dairy Research Institute in 1963 and his career path led him to the University of the Free State (as lecturer and Head of Food Science); Deputy Director at ARC and Research Professor at the Tshwane University of Technology.

He was also an emeritus professor in Food Science at the University of the Free State. He was an Honorary Research Associate of the School of Molecular and Cell Biology of the University of the Witwatersrand and

did regular peer reviews of researchers and research proposals in his field of expertise for the National Research Foundation.

Prof Piet Jooste has been involved in the SA National Committee of the International Dairy Federation for decades, also serving as President of this organization in the early 2000s. He served on various scientific committees of the International Dairy Federation.

Prof Jooste was awarded *The Dairy Mail* "News Maker of the Year" accolade for 2004, in recognition of the success of the Symposium on Dairy Hygiene & Safety and his Presidency of the National Committee of the International Dairy Federation.

He served on various structures of the organised dairy industry, such as the Board of the Dairy Standard Agency and the Dairy R&D Committee of Milk SA. As a specialist in microbiology and biochemistry, Prof Jooste has facilitated many projects of Milk SA, while providing expert support to the projects. Amongst others, he has made enormous contributions to finding solutions for protein instability in milk.

