



Co-ordination, support and promotion of needs-driven research & development in the South African dairy industry.

(PRJ-0368-2024)

Dr Heinz Meissner

Year 2024 (January 2024 till December 2024)

Project goals

Goal 1 - To limit research fragmentation and promote and initiate cooperation between R&D capacities towards achieving the strategic direction of the industry

Achievements

Negotiations with the Technology Innovation Agency (TIA) culminated in a MoA to co-fund priority research projects of Milk SA over the three years 2025 to 2027. To confirm the commitment a formal signing occasion between the TIA and Milk SA and a press release was arranged at the offices of the TIA. The TIA will co-fund to the extent of R3-4 million per year. The funding is expected in the first quarter of 2025.

The following projects have been identified for co-funding, which in terms of the goal of cooperation between institutions, largely meet the objective. The projects are:

Exploring the facial eczema problem in dairy cattle in the Eastern Cape of, South Africa, with a focus on the fungus *Pseudopithomyces chartarum* (FABI, University of Pretoria (UP): Project leader: Dr Neriman Yilmaz-Visagie)

To support collaboration, an Agreement was formalized between Milk SA, FABI and Beef and Lamb, New Zealand (B & LNZ), since the problem of sporidesmin toxicity (facial eczema) on pastures in NZ is as important as in SA. The FABI-NZ project pays attention to characterization of the sporidesmin fungus *Pseudopithomyces chartarum* causing facial eczema in the Eastern Cape. Informal collaboration is also between FABI and Dr. Jerome Collemare from the Westerdijk Fungal Biodiversity Centre in the Netherlands, who is comparing South African genomes with the New Zealand genome.

Investigation of photosensitivity-related conditions in pasture-based dairy cattle (Project leader: Dr Anthony Davis, Veterinary Clinic, Humansdorp, who is working together with FABI, UP Onderstepoort and the Biochemistry group at UP)

Immune profiling of the early to latent stages of Bovine infection with *Brucella abortus*: A new opportunity for vaccine and drug development (Project Leader: Prof Christine Maritz-Olivier, Dept of Genetics, in collaboration with the Group of Dr Suleman at the CSIR).

The quantitative impact of different on-farm management options using the DESTiny tool (Project leader: Prof James Blignaut, Asset Research, in collaboration with Riana Reinecke, FarmVision and Prof Pieter Swanepoel, University of Stellenbosch (US))

Field testing of phycoremediation on two dairy farms in South Africa (Project leader: Dr Jon

McGosh, Institute for Natural Resources and Prof Sheena Kumari, Durban University of Technology)

An on-farm integrative waste and nutritive flow management decision-support tool for dairy production in South Africa (Project leader: Prof James Blignaut, Asset Research, Prof Eugene van Rensburg, Dept of Chemical Engineering, US and Dr Craig Galloway, Trace & Save).

The TIA co-funding and other additional R & D projects, which are planned for the next three-year cycle, commencing in 2025, have significant implications towards environmental sustainability, animal health and welfare, and the strategic direction of the industry. What became crucial though, is that FMD work also had to be included in the programme, as the disease is globally rather uncommon in dairy farming, and thus an urgent project has been included in the programme with the title: DIAGNOSTIC OPTIONS FOR SURVEILLANCE FOR FOOT AND MOUTH DISEASE.

No Non-achievements / underperformance has been reported

Goal 2 - To guide the R&D program by means of effective structural and R & D Committee arrangements, initiating and promoting research initiatives, research project construction and evaluation, and fund sourcing

Achievements

Administration and planning are done with the aid of the Dairy Research and Development Committee (DRDC), as informed by the Management Committee (MANCOM). Four Meetings of each were held in the year. The most important items dealt with during the year include:

Milk processors and farmers were very much in favour of establishing a Milk SA R&D office in Jeffreys Bay, but agreed that such an office should only follow after establishment of a DSA laboratory there. The feasibility of establishing a laboratory in the area is being pursued by Mr Burger, Dr Davis and Dr Meissner. The envisaged laboratory in the Eastern Cape would not be a duplication of the DSA laboratory in Centurion but would be able to provide more services, also to support future research needs. The establishment of the laboratory would relate to government and government driven laboratories by being subject to the authority of the national government in terms of competence, whilst the execution of competence evaluations would be by the provincial government veterinarians. In further interactions it was decided that the umbrella goal of the facility will be Bio-security support to the industry as a means of enhancing sustainability, and since the facility will deal with communicable diseases, the possibility of a PPP between Milk SA and DALRRD should be investigated.

Dr Chimes, apart from his representation of the SA Veterinary Association on the National Animal Health Forum (NAHF), will also represent Milk SA. This is important considering the special attention given to Brucellosis at the NAHF, and in a further well come development, he has been elected Chairman of the CA and TB steering committee of the NAHF. Also, further regarding Brucellosis, the DSA laboratory is interacting with the DALRRD and is well advanced in the process of doing Brucellosis tests. As Chairperson of the Brucellosis Steering Committee, he will strive to standardize testing in the dairy industry across provinces and encourage the beef industry to vaccinate, possibly by proposing an incentive scheme. Furthermore, in support of the stance of Milk SA, Dr Chimes will recommend that where initial blood tests in dairy cows yielded negative results for two years, the blood tests could be replaced by Milk Ring Tests, whereas abattoir tests on culled cows should be performed to declare an area free from Brucellosis.

The devastating effect of heat stress on production, fertility, the unborn calf and immunity was discussed, but at this stage the intention of an envisaged project is to look at cow performance variation against climatic variation. It could be that in the practice of culling cows on the basis of production, reproduction, inter calving periods etc., the effect of heat stress as a reason for the culling have probably not being considered. Consequently, selection of heat stress tolerant cows may have already and unintentionally taken place resulting in a more resilient herd. Nevertheless, Dr. Meissner will contact farmers to establish if sufficient data was available for a project to evaluate if selection could be done on dairy cows which are more heat stress tolerant or resistant than others. Similarly, he will liaise with a farmer that apparently has had considerable success with utilising genomic selection, in order to promote the use thereof by other farmers.

Drs. Ohlhoff and Meissner, and Mr. Fouché discussed the Dairy Sustainability Framework membership of Milk SA with Mr. Brian Lindsay of the DSF, in order to understand whether membership should change. It was decided that the Affiliate membership will continue as Milk SA cannot meet the obligations

of Aggregate membership.

Dr Ohlhoff is doing a situation analysis on the trading of carbon credits to establish if there could be benefits to the dairy industry, and if so, how to implement such a system. A section on carbon credits, tax and trade has also been added to the "Sustainability in the SA dairy industry: A status and progress report". During his investigation, he referred to the current notion by organisations with high carbon emissions to buy carbon credits from the dairy sector to offset against their emissions, which may not be the preferred outcomes. As a further endeavour, Dr Ohlhoff raised the matter of carbon credits at the World Dairy Summit 2024, where at a joint meeting of the Standing Committees of Environment, Dairy Policies and Economics, Marketing and Nutritional Health it transpired that IDF itself did not have a position on carbon credits. Dr Ohlhoff was of the opinion that they would start investigating this matter in due course.

In line with the carbon credits issue, Dr Meissner referred the meeting to the recently promulgated Environmental Act which requires different sectors to set targets for their gas emissions. The DEF, as the administrator of the Act, placed the responsibility to determine the rate of decreasing the carbon footprint (CFP) on the respective responsible government departments; in the case of dairy, DALRRD. They requested these departments to determine a baseline for 2025 so that by 2030 it can be calculated how the CFP had declined. AgriSA and DALRRD have put together dedicated committees to develop the Sector Emission Targets (SETs) for Agriculture, still in 2025. The outcomes may well result in a carbon tax system for Agriculture. Developments will be monitored.

At the initial stages of FMD infection, Dr. Chimes in collaboration with others drew up communiques on FMD and Brucellosis to the DALRRD to suggest measures to deal with the situation. In this context, the references to regulations or lack thereof in the FMD letter and the document to the AAMP, should be, according to Dr. Meissner, turned into requests to DALRRD for appropriate, fair, implementable, enforceable and clear regulations applicable to the dairy industry. These suggestions have been included in the communiques. At the same time, the CEO of Milk SA should issue a press release informing the media that Milk SA had taken action in relation to the FMD outbreak in the Eastern Cape, mentioning that the issues of vaccination, movement of animals as well as abattoirs and slaughtering are being addressed. As a further communication action, Dr Meissner should draw up a chronologic record of developments of the FMD saga to be forwarded by the CEO to the Milk SA Board. Both actions were done. Following the successful control of the spread of FMD on dairy farms in the Eastern Cape, Dr. Chimes and Dr. Davis as a follow-up action, are documenting a basic strategy in terms of what they experienced during the outbreak of FMD in the Eastern Cape and that this document would be circulated to role-players to support biosecurity. Dr. Chimes also recommended that research into the duration of FMD viral excretion into milk as well as ways to prevent or minimize double pasteurization of virus infected milk, were important areas to investigate with the FMD SAT strains. (See project proposal under Goal 1). Finally, it was decided to put a formal request by the DRDC to Dr. Maja of the DALRRD to revise the current FMD protocol, since it is outdated. Due to budget shortages Dr Meissner shared his estimates of cuts to the total amount of R2 244 283 with DRDC members, and advanced a budget of R6 387 300 for 2025. To rectify,

the CEO informed the meeting that from 2026 the allocation for the R&D project would probably increase from the current 6.5% of levies to between 8 and 9% of levies. The suggested increase would be much more in line with R & D levy allocations for other agricultural industries in SA to R & D. He suggested that Dr Meissner compile a basis document of funds required by the R&D programme for the four-year period from 2026 to 2029.

Dr Meissner referred the meeting to the list he compiled of scientific publications and post-graduate qualifications from research projects funded or associated with the Milk SA R&D programme over the five-year period from 2020 to 2024 (see Attachment 1 in the Main Report). He presented this for information of the meeting and to indicate that substantial development flowed from projects which were dealt with by the DRDC.

Dr Meissner, Mr. Fouché and Mrs. Rademan should urgently address ways and means to communicate to unprocessed milk producers, milk processors and dairy product consumers, the results and information generated by the Milk SA R&D Programme, since many members are largely ignorant thereof. In support, Dr Meissner should compile a brief document on the work that has been done to date by the R&D Project from available information which could be presented for editorial review for the format of an eye-catching booklet. (The basis document has been compiled – see Attachment 2 in the Main Report).

No Non-achievements / underperformance has been reported

Goal 3 - To accumulate and publish existing domestic and international scientific knowledge of applicable and practical value to enhance the industry

Achievements

THE RESEARCH COLUMN and DAIRY R & D IN SA: The target of respectively scientific articles sourced from the international literature and SA scientific articles to be entered on the website is two per month, i.e. 24 for the year. The target was met. Some of the articles have been published in the Dairy Mail under the regular Research Column of the Project Manager and others in the Milk Essay.

The list for THE RESEARCH COLUMN was:

Machine learning for the prediction of subclinical mastitis in cows milked in automatic milking system.

Perspective: How to address the root cause of milk fat depression in dairy cattle.

Replacement of soybean meal with canola improves short-term milk yield and nitrogen-use efficiency in high-producing, early-lactation Holstein cows.

Effects of adding natural additives to whole milk on performance, faecal, and blood parameters in suckling Holstein calves.

Breeding for heat tolerance.

Echotextural and ultrasonic detection of sub-clinical and clinical mastitis.

Gas exchange, rumen hydrogen sinks, and nutrient digestibility and metabolism in lactating dairy cows fed 3-nitrooxypropanol and cracked rapeseed.

Effects of dairy farming management practices on carbon balances in New Zealand's grazed grasslands: Synthesis from 68 site-years.

Host and rumen microbiome contributions to feed efficiency traits in Holstein cows.

A comparison of the bio-accessible calcium supplies of various plant-based products relative to bovine milk.

Lactation curves of Montbéliarde-sired and Viking Red-sired crossbred cows and their Holstein herdmates in commercial dairies.

Life cycle inventory of 23 dairy farms in south-western Sweden. SIK-rapport Nr 728 2004.

Effects of different temperature-humidity indexes on milk traits of Holstein cows: A 10-year retrospective study.

Genome-wide association study of age at puberty and its (co)variances with fertility and stature in growing and lactating Holstein-Friesian dairy cattle.

Effects of simplified group housing on behavior, welfare, growth performance, and health of preweaned dairy calves on a California dairy.

Association between days post-conception and lactation persistency in dairy cattle.

Pasture feeding improves the nutritional, textural, and techno-functional characteristics of butter.

Effects of feeding whole-cracked rapeseeds, nitrate, and 3-nitrooxypropanol on composition and functional properties of the milk fat fraction from Danish Holstein cows.

Dry matter intake in US Holstein cows: Exploring the genomic and phenotypic impact of milk components and body weight composite.

Effects of bulk tank milk, waste milk, and pasteurized waste milk on the nutrient utilization, gastrointestinal tract development, and antimicrobial resistance to *Escherichia coli* in

preweaning dairy calves.

Feeding rumen-protected methionine during the peripartum period improved milk fat content and reduced the culling rate of Holstein cows in a commercial herd.

Effects of dose, dietary nutrient composition, and supplementation period on the efficacy of methane mitigation strategies in dairy cows: A meta-analysis.

Vertical back movement of cows during locomotion: detecting lameness with a simple image processing technique, and Potential biomarkers for lameness and claw lesions in dairy cows: A scoping review.

Investigation of livestock transport trailers as potential fomites for antibiotic-resistant *Escherichia coli*.

The list for DAIRY R & D IN SA was:

TRACE MINERAL STATUS OF DAIRY COWS IN THE TSITSIKAMMA
MODEL TO CALCULATE THE ENVIRONMENTAL, NUTRITIONAL AND ECONOMIC STATUS
OF MILK AND PLANT-BASED BEVERAGES.

WHICH BREED IS MORE SUITABLE FOR PASTURE SYSTEMS – HOLSTEIN OR JERSEY?

TOOLS TO CALCULATE THE ENVIRONMENTAL FOOTPRINT OF DAIRY FARMS.

DO WE PAY SUFFICIENT ATTENTION TO FERTILITY?

PROBLEMS FACED BY DAIRY SMALL-SCALE FARMERS.

GOOD AGRICULTURAL PRACTICE INTERVENTIONS IN THE SA DAIRY INDUSTRY
THE IMPORTANCE OF HOOF TRIMMING DATA IN CLAW LESION INVESTIGATIONS

COW WELFARE IN SUSTAINABLE BREEDING OBJECTIVES

BIOSTIMULANTS ON RYEGRASS – CLOVER PASTURES FOR DAIRYING.

ENVIRONMENTAL SUSTAINABILITY IN THE SOUTH AFRICAN DAIRY INDUSTRY
PRE-CALVING FIBRE-BASED DIETS FOR DAIRY COWS.

EFFECT OF FEED ENERGY LEVELS ON METABOLISM AND OVARIAN FUNCTION.

ESSENTIAL MICROBIAL GROUPS TO BE MONITORED IN MILK FOOD SAFETY.

PLANTAIN CAN SAVE CONCENTRATE SUPPLEMENT COSTS FOR GRAZING DAIRY
COWS.

RELATIONSHIP BETWEEN NUMBER OF DAYS IN MILK IN FIRST LACTATION COWS AND
THEIR LIFETIME MILK YIELD.

HEAT STRESS IN COWS – EFFECTS AND CONSEQUENCES

SELECTION FOR FERTILITY AND MILK PRODUCTION – HOW TO SELECT.

NON-GENETIC FACTORS INFLUENCING FEED EFFICIENCY TRAITS IN COWS

THE EFFECT OF EBV ON LIFE TIME MILK YIELD AND YIELD EFFICIENCY

PREDICTION MODELS FOR GROSS FEED EFFICIENCY FOR TMR SYSTEMS

EVALUATION OF THE ENVIRONMENTAL, NUTRITIONAL AND ECONOMIC IMPACT OF MILK AND
PLANT-BASED BEVERAGES.

UNDERSTANDING NET GREENHOUSE GAS (GHG) EMISSIONS BY CATTLE

COMPREHENSIVE APPROACH TO EVALUATE SUSTAINABILITY IN MILK AND PLANT-BASED
BEVERAGE PRODUCTION

The following articles were compiled for the MILK ESSAY:

**A MODEL TO CALCULATE THE ENVIRONMENTAL, NUTRITIONAL AND ECONOMIC
STATUS OF MILK AND PLANT-BASED BEVERAGES ESTABLISHED.
ENVIRONMENTAL SUSTAINABILITY IN THE SOUTH AFRICAN DAIRY INDUSTRY
RECENT RESULTS PERTINENT TO STRUCTURED BREEDING PROGRAMMES OF DAIRY
FARMERS.**

No Non-achievements / underperformance has been reported

Goal 4 - To advise and assist with national and international managerial, strategic and position publications on any matters which may support the strategic direction of the industry

Achievements

The sustainability document: "Sustainability in the SA Dairy Industry: A Status and Progress Report" provides strategic and position guidance to the Board and officials. The decision was that updates will be done in April and October, and the document will, apart from internal distribution, also be sent to the DSF to evaluate progress of the SA Dairy Industry on international sustainability goals. The October 2024 edition is available at the Milk SA website.

No Non-achievements / underperformance has been reported

Goal 5 - To support the dairy industry with R & D and advice on matters affecting sustainability, such as environmental – GHG reduction, carbon sequestration, water use efficiency, waste treatment, ecosystem and biodiversity protection – and animal welfare. To that effect, also oversee the Animal Health and Welfare and Environment programmes

Achievements

The sustainability document mentioned under Goal 4 is compiled in line with the UN's 2030 Development Goals with much emphasis on GHG reduction, water use, waste reduction, ecosystem and biodiversity protection, and animal care.

Additional articles aligned with Goal 5 objectives from the list under Goal 3 are:

Effects of dose, dietary nutrient composition, and supplementation period on the efficacy of methane mitigation strategies in dairy cows: A meta-analysis.

Vertical back movement of cows during locomotion: detecting lameness with a simple image processing technique.

Potential biomarkers for lameness and claw lesions in dairy cows: A scoping review.

EVALUATION OF THE ENVIRONMENTAL, NUTRITIONAL AND ECONOMIC IMPACT OF MILK AND PLANT-BASED BEVERAGES.

UNDERSTANDING NET GREENHOUSE GAS (GHG) EMISSIONS BY CATTLE

COMPREHENSIVE APPROACH TO EVALUATE SUSTAINABILITY IN MILK AND PLANT-BASED BEVERAGE PRODUCTION

A recent review where the author is co-author is also relevant: R. Reinecke, J.N. Blignaut, H.H. Meissner & P.A. Swanepoel, 2024. Advancing carbon sequestration and nutrient management in the South African dairy industry for sustainable growth. *Front. Sustain. Food Syst.* 8:1397305. doi: [10.3389/fsufs.2024.1397305](https://doi.org/10.3389/fsufs.2024.1397305)

No Non-achievements / underperformance has been reported

Income and expenditure statement

Income and expenditure statement	MSA Meissner_PRJ-0368_Annual Report_2024_Expenditure.docx
Unnecessary spending during period	No

Popular Report

[MSA Meissner_PRJ-0368_Annual report_2024_Popular Report.docx](#)

Additional documentation

[MSA Summarized results of R & D Projects since 2015.docx](#)

[MSA INVENTORY OF DAIRY R.docx](#)

Statement

Levy funds were applied only for the purposes stated in the contract	Yes
Levy funds were applied in an appropriate and accountable manner	Yes
Sufficient management and internal control systems were in place to adequately control the project and accurately account for the project expenditure	Yes
The information provided in the report is correct	Yes